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**EXPLANATION OF SIGNIFICANT DIFFERENCES
MIDDLE WATERWAY
COMMENCEMENT BAY NEARSHORE/TIDEFLATS SUPERFUND SITE
FEBRUARY 2002**

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ABBREVIATIONS AND ACRONYMS

AOC	administrative order on consent
ARARs	applicable or relevant and appropriate requirements
BA	biological assessment
CAD	confined aquatic disposal
CB	Commencement Bay
CBN/T, CB/NT	Commencement Bay Nearshore/Tideflats
CDF	confined disposal facility
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CHB	Citizens for a Healthy Bay
CM	Centimeter
COE	U.S. Army Corps of Engineers
DER	data evaluation report
DESD	draft explanation of significant differences
DNR	Department of Natural Resources
Ecology	Washington State Department of Ecology
EE/CA	engineering evaluation/cost analysis
ENR	enhanced natural recovery
EPA	U.S. Environmental Protection Agency
ESD	explanation of significant differences
HPAHs	high-molecular-weight polycyclic aromatic hydrocarbons
LPAHs	low-molecular-weight polycyclic aromatic hydrocarbons
MLLW	mean lower low water
MTCA	Model Toxics Control Act
MUDS	Multi-user Disposal Siting
MWAC	Middle Waterway Action Committee
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NOAA	National Oceanic and Atmospheric Administration
NPL	National Priorities List
NR	natural recovery
NRDA	natural resource damage assessment
OMMP	operations, maintenance, and monitoring plan
OU	operable unit
OVRA	Olympic View Resource Area
PAHs	polycyclic aromatic hydrocarbons
PCBs	polychlorinated biphenyls
PRPs	potentially responsible parties
RCW	Revised Codes of Washington
RI/FS	remedial investigation/feasibility study
ROD	record of decision
SEPA	state environmental policy act
SMU	sediment management unit
SQO	sediment quality objective

SQS

sediment quality standard

TOC

total organic carbon

UBAT

Urban Bay Action Team

WDNR

Washington State Department of Natural Resources

EXPLANATION OF SIGNIFICANT DIFFERENCES COMMENCEMENT BAY NEARSHORE/TIDEFLATS SUPERFUND SITE

February 2002

I. INTRODUCTION

A. Purpose

EPA's September 30, 1989 Record of Decision (ROD) for the Commencement Bay Nearshore /Tideflats (CB/NT) Superfund site selected a remedy involving a combination of five key elements: site use restrictions (now commonly referred to as institutional controls), source control, natural recovery, sediment remedial action (i.e., confinement and habitat restoration), and monitoring, to address contaminated sediments in the waterways of the CB/NT site. In July 1997, EPA issued an Explanation of Significant Differences (ESD) which modified the PCB cleanup level. In August 2000, EPA issued an ESD which described the cleanup plans for three of the waterways in Commencement Bay—Thea Foss, Wheeler-Osgood and Hylebos— and identified the disposal sites selected to contain dredged contaminated sediments from all the waterways. The purpose of this ESD is to describe the specific cleanup plans for Middle Waterway. The specific requirements and clarifications provided in the July 1997 and August 2000 ESDs are not repeated here but are applicable to Middle Waterway as well. This ESD describes the manner in which the remedial methods outlined in the ROD will be applied in Middle Waterway and identifies those instances where the selected remedy differs from the ROD.

B. Lead and Support Agencies

U.S. Environmental Protection Agency (EPA) – Lead Agency for Sediment Remediation

Washington State Department of Ecology (Ecology) - Lead Agency for Source Control; Support Agency for Sediment Remediation

Puyallup Tribe of Indians - Support Agency for Sediment Remediation

C. Statutory Authority

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Section 117(c) and National Oil and Hazardous Substances Pollution Contingency Plan (NCP), Section 300.435(c)(2)(i).

II. BACKGROUND

A. Site Name, Location and History

The CB/NT Superfund site is located in Tacoma, Washington at the southern end of the main basin of Puget Sound (Fig. 1). The site includes 10-12 square miles of shallow water, shoreline, and adjacent land, most of which is highly developed and industrialized. The upland boundaries of the site are defined according to the contours of localized drainage basins that flow into the marine waters. The marine boundary of the site is limited to the shoreline, intertidal areas, bottom sediments, and water of depths less than 60 feet below mean lower low water level (MLLW). The nearshore portion of the site is defined as the area along the Ruston shoreline from the Mouth of Thea Foss Waterway to Pt. Defiance. The tideflats portion of the site includes the Hylebos, Blair, Sitcum, Milwaukee, St. Paul, Middle, Wheeler-Osgood, and Thea Foss waterways; the Puyallup River upstream to the Interstate-5 bridge; and the adjacent land areas. Middle Waterway is located between Thea Foss Waterway and the Puyallup River.

EPA placed the CB/NT site on the National Priorities List (NPL) of sites requiring investigation and cleanup under EPA's Superfund Program on September 8, 1983. A remedial investigation/feasibility study (RI/FS) was completed by Ecology in 1988. EPA made the final RI/FS and Proposed Plan available for public comment in February 1989. The RI/FS evaluated contaminants detected in sediments at the CB/NT Superfund site to identify problem chemicals that pose a risk to human health and the environment. The RI/FS concluded that sediments in the nearshore/tideflats area were contaminated with a large number of hazardous substances at concentrations greatly exceeding those found in Puget Sound reference areas. In the RI, a multi-step decision-making process was used to identify problem chemicals, and to identify and prioritize problem areas where these chemicals were present at concentrations that are harmful to humans and wildlife. Contaminated sediments in Middle Waterway have high concentrations of mercury, copper, and PAHs.

In 1996, EPA deleted the St. Paul Waterway, the Blair Waterway, and all or part of four properties transferred to the Puyallup Tribe in the Puyallup Land Settlement Agreement from the NPL because cleanups had been completed in these areas, or studies had been completed showing that they did not require cleanup.

B. Commencement Bay Nearshore/Tideflats Record of Decision

The Commencement Bay site has been divided into smaller project activities, called operable units (OU), in order to more effectively manage the overall cleanup of the site. In the 1989 ROD, EPA designated two operable units for the cleanup of the nearshore/tideflats portion of Commencement Bay: source control (OU 5), which focuses on efforts to control upland discharges or releases to the Bay; and sediment remediation (OU 1), which addresses the cleanup of the contaminated marine sediments in Commencement Bay. The Washington Department of Ecology is the lead agency for source control and EPA is the lead agency for sediment

remediation. OUs 2-4 and 6 address contamination at geographically separate areas at the former ASARCO smelter and Tacoma Tar pits.

In the 1989 ROD, EPA selected a remedial action for eight of the nine sediment problem areas which were identified during the RI/FS. These problem areas are: 1) Mouth of Hylebos Waterway, 2) Head of Hylebos Waterway, 3) Sitcum Waterway, 4) St. Paul Waterway, 5) Middle Waterway, 6) Head of Thea Foss Waterway, 7) Mouth of Thea Foss Waterway, and 8) Wheeler-Osgood Waterway. The ninth problem area, off-shore of the ASARCO smelter (OU 6), was addressed in a separate ROD signed in July 2000. To date, remedial actions consistent with the 1989 ROD have been completed at the Sitcum and St. Paul waterways.

The cleanup objective for the remedial action, as described in Section 10 of the 1989 ROD, states that "the selected remedy is to achieve acceptable sediment quality in a reasonable time frame." "Acceptable sediment quality" is defined as "the absence of acute or chronic adverse effects on biological resources or significant human health risks". The ROD designated biological test requirements and associated sediment chemical concentrations referred to as sediment quality objectives (SQOs) to attain the cleanup objective for the CB/NT site. The PCB SQO was subsequently updated in a 1997 ESD. Habitat function and enhancement of fisheries resources were also identified as overall project cleanup objectives.

The ROD selected a remedy comprised of five key elements: site use restrictions (now commonly referred to as institutional controls), source control, natural recovery, sediment remedial action (i.e., confinement and habitat restoration), and monitoring, to address contaminated sediments in the waterways of the CB/NT site.

The ROD noted that institutional controls would consist primarily of public warnings to reduce potential exposure to site contamination, particularly through consumption of contaminated seafood. The Tacoma/Pierce County Health Department has installed signs at several locations in the CB/NT waterways providing warnings in several languages against eating seafood caught there.

The objectives under source control are to control major sources of contamination to the waterways prior to implementation of active remediation in the waterways and to monitor source control effectiveness both prior to and after completion of sediment remedial action.

For marginally contaminated areas expected to recover naturally to the SQOs within 10 years after sediment remedial action, the ROD calls for natural recovery. For areas that are not expected to recover within a 10-year time frame, the ROD specified that active remediation of problem sediments would be accomplished by utilizing a limited range of four confinement technologies. These technologies are in-place capping, confined aquatic disposal, nearshore disposal, and upland disposal.

Long-term monitoring of the remediated areas, including disposal sites and habitat mitigation

areas, is also a component of the remedy. Monitoring will be conducted to evaluate the effectiveness of the remedy in achieving SQOs and in achieving the habitat functions that are called for in the mitigation plans.

III. DESCRIPTION OF AND BASIS FOR THE SIGNIFICANT DIFFERENCES

A. Introduction

The CB/NT ROD sets forth a general cleanup approach for the waterways that comprise the CB/NT site and identifies, based on RI/FS sampling data, problem areas requiring response action. In addition, the August 2000 ESD identified disposal sites (nearshore, in-water, and upland) which would be most appropriate to safely contain dredged sediments. Since then, pre-remedial design studies for Middle Waterway have better defined the area and volume of sediment exceeding the SQOs, and identified specific areas to be dredged or capped, as well as areas where natural recovery or enhanced natural recovery would be appropriate.

This ESD documents the following changes for Middle Waterway:

- a) the size of the problem area and the volume of sediment to be dredged;
- b) the disposal site for contaminated sediments; and
- c) the cost of the remedial action.

None of these significant differences discussed below fundamentally alter the remedy selected in the ROD.

B. Volume

The ROD recognized that the estimated quantity of sediments needing active remediation (i.e., dredging and disposal or in-situ capping), as well as the associated costs, would be refined during the remedial design phase. Since the ROD was signed, additional investigations and studies have been undertaken by the potentially responsible parties (PRPs) at each of the waterways. Post-ROD studies in Middle Waterway identified a higher volume of sediment that requires dredging and disposal than was originally estimated in the ROD. These studies demonstrate that sediment contamination extends to greater depths than was believed when the 1989 ROD was issued. A comparison of the volume estimate in the 1989 ROD with the refined volume estimate is provided in Table 1.

Table 1. Comparison of 1989 ROD and 2001 ESD Volume Estimates for Areas Requiring Dredging

	1989 ROD volume estimate	2001 ESD volume estimate
Middle Waterway	57,000 cy	92,700 cy

C. Selection of Disposal Sites

As summarized in EPA's August 2000 ESD, EPA has selected Blair Slip 1, the St. Paul Nearshore Fill and disposal at an upland regional landfill as approved disposal sites to contain contaminated sediments dredged from Hylebos, Thea Foss, Wheeler-Osgood, and Middle Waterways. More detailed information about the selected disposal sites is provided in the August 2000 ESD.

Recently, the Middle Waterway Action Committee (MWAC) signed an agreement with the Port of Tacoma to use the Blair Slip 1 nearshore fill for disposal of contaminated sediments from Middle Waterway. Mitigation measures required for disposal in Blair Slip 1 are being addressed by the Port of Tacoma as part of the Hylebos Waterway cleanup.

D. Costs

The 1989 ROD provided a range of cost estimates for dredging contaminated sediments and disposal by confined aquatic disposal, nearshore disposal, or upland disposal. Table 2 provides a comparison of the cost estimates in the 1989 ROD to the estimates for implementing the remedial actions outlined in this ESD. The cost estimate has increased since the 1989 ROD.

Table 2. Comparison of cost estimates in the 1989 ROD and the 2001 ESD

	1989 ROD cost estimate (\$ million)	2001 ESD cost estimate (\$ million)
Middle Waterway	\$2.66 - \$7.47	\$12.3

The 1989 ROD cost estimates were based on a smaller volume of sediment to be dredged, as shown in Table 1. Disposal costs have also increased since 1989. Detailed cost estimates are provided in the Middle Waterway Evaluation of Remedial Options Report (2001) and in Appendix A of this ESD.

For the purposes of providing cost estimates, EPA has assumed that Middle Waterway contaminated sediments will be disposed of in Blair Slip 1 based on cleanup options developed by the Middle Waterway PRPs. EPA reserves the flexibility to allow the PRPs to make adjustments to the disposal location (among the three disposal sites selected by EPA) during

design based on final disposal capacity, volumes, and timing.

IV. PERFORMANCE CRITERIA FOR THE REMEDIAL ACTIONS

For all the waterways in Commencement Bay, the August 2000 ESD expands on and clarifies the general cleanup approach set forth in the CB/NT ROD; it includes the Endangered Species Act (ESA) as an applicable, or relevant and appropriate, requirement (ARAR) for remedial actions under the ROD; it selects two in-water disposal sites and upland disposal as acceptable disposal options; and, it provides performance criteria to be applied to the design and implementation of the selected remedial actions and mitigation projects. Those performance criteria apply to all capping, dredging, confined disposal, natural recovery, and enhanced natural recovery activities, and address subsurface contamination and mitigation. The additional requirements and clarifications supplied in the August 2000 ESD are not repeated here but are applicable to the Middle Waterway. While this ESD describes the remedial actions for the Middle Waterway with some degree of specificity, remedial design will further refine the details of the remedial action.

V. DESCRIPTION OF IN-WATERWAY REMEDIAL ACTIONS

EPA and MWAC, which is comprised of Foss Maritime Co., Marine Industries Northwest, Inc., and Pioneer Industries, Inc., entered into an Administrative Order on Consent (AOC) for preparation of pre-remedial and remedial design studies for Middle Waterway in April 1997. Under the AOC, MWAC has completed two rounds of sampling to characterize the nature and extent of contamination, and prepared a pre-design data evaluation report, evaluation of remedial options report, and recommended remediation plans. EPA has reviewed and approved these reports and has placed them in the Administrative Record.

The areas within Middle Waterway that require cleanup have been identified. The Middle Waterway has been organized into Sediment Management Units (SMU's), which are depicted in Figure 2. There are sixty-seven (67) SMU's in Middle Waterway, distributed among three different segments in the Waterway known as Areas A, B, and C. The studies completed to date indicate that the most severe contamination is located at the mouth of Middle Waterway and in the subsurface sediments at the head of the waterway (i.e., Areas A and C). The primary contaminants of concern in Middle Waterway sediments are mercury, copper, and PAHs.

Substantial active remediation is needed to achieve cleanup objectives, particularly in Area A. The following paragraphs describe EPA's remediation plan for Middle Waterway, consistent with the remedial action EPA selected in the ROD and similar to MWAC's preferred alternative as proposed to EPA in the Final Recommended Remediation Plans for Areas A, B and C (dated November 24, 2000, and revised April 9, 2001), with some modifications. EPA's remedy is described below. The selected cleanup actions are protective of human health and the environment and provide the best overall effectiveness proportional to their costs.

A. Area A

Selected Remedies

The majority of sediments within Area A have SQO exceedences that require removal and/or capping. Figure 2 shows the locations of all the SMUs in Middle Waterway. Appendix B identifies the selected remedy for each SMU.

Under EPA's remediation plan, problem sediments in SMUs 1 - 3b, 4a, 6, 7, 9a, 9b, 15a, 16 - 24, 26 - 38, 40 - 42, and 44 - 47 will be dredged. Additional dredging in adjacent SMUs will be done to provide an even grade between dredged and non-dredged SMUs. Sediments in SMU 4b will be capped. Due to the presence of obstacles such as marine railway structures, sediments in SMUs 30, 31, and 32 will first be dredged to the extent possible and then capped. Enhanced natural recovery will be used at SMU 5a. SMUs 4c, 5b, 8, 10, 11, and 25 will be monitored for natural recovery. SMUs 12 - 14, 15b, 39, 43, and 48 - 50 are designated for no action. Institutional controls will also be required in areas that will be capped or where enhanced natural recovery will be used to ensure that these remedial actions will not be compromised in the future. Specific controls will be determined during design.

The following paragraphs provide additional clarification regarding selected elements of the remedy:

- (a) Capping will provide better protection than natural recovery at SMU 4b because EPA believes the net sedimentation rate used by MWAC in the natural recovery model is too high considering the amount of boat traffic and potential sediment resuspension associated with the nearby Foss dock. In addition, even when using the higher net sedimentation rate, the model predicts a recovery time for mercury exceeding fifteen years, which is an unacceptably long time for natural recovery, and inconsistent with the ROD.
- (b) For SMUs 4c and 25 EPA selects natural recovery along with monitoring based on the limited chemical data associated with these SMUs and their proximity to SMUs proposed for dredging.
- (c) The Olympic View Resource Area (OVRA), a separate problem area in the CB/NT Superfund site, is adjacent to SMU 5a. As part of the planned removal action for OVRA, a portion of SMU 5a will be excavated to a minimum depth of 1.1 feet below existing grade and then backfilled with a minimum thickness of 1.3 feet of clean import material (see City of Tacoma's Engineering Evaluation/Cost Analysis for the Olympic View Resource Area Removal Action dated April 30, 2001). That cleanup action will address the location of one of the mercury exceedences in SMU 5a. A thin layer (10 cm) of clean sediment will be placed in the portion of SMU 5a not effected by the removal action at OVRA to address another slight exceedance of the mercury SQO. SMU 5a in its entirety will be monitored for enhanced natural recovery. The long-term monitoring program needs to include specific measures to monitor the effectiveness

and persistence of enhanced natural recovery in this area. These measures will include as a minimum collection and analysis of surface sediment samples, biological testing, and routine survey and inspection for evidence of erosion. If monitoring program results indicate erosion or other potential failure of the remedy for SMU 5a, EPA will evaluate other options which may include but are not limited to the need for expanded monitoring or more active remediation.

(d) Not enough samples have been taken in SMU 5b to define the levels of contamination, if any. This is due to several factors including difficulties encountered in collecting sediments in this area and the method used to composite samples. Therefore, at this time, there is very limited information available for SMU 5b. SMUs 5a and 5b are adjacent to two large eelgrass beds located approximately 500 feet offshore in the shallow subtidal and deep subtidal areas of the low gradient beach off the peninsula that forms Middle Waterway. These eelgrass beds provide critical salmon habitat within Commencement Bay. The PRPs must evaluate through sampling and analysis during the early stages of remedial action whether natural recovery will be sufficient to be protective of this area by reducing existing chemical concentrations to SQOs within ten years after sediment remedial action. Results of this sampling and analysis effort will be used to decide what, if any, additional remedial action is needed.

(e) In general, areas requiring dredging will be dredged deep enough to expose clean sediments (generally defined as below the SQO). In a few locations dredging to depths of more than ten feet below the mudline will be required to remove contaminated sediment, but in most locations dredge depths will be less than ten feet. Remedial design documents will specify dredging depths for all areas except those noted in (f) below. Post-dredge confirmation samples will be collected to assess chemical concentrations and verify that all contamination has been removed. At SMUs 3b, 30, 31, and 32 approximately three feet of material will be removed around the marine railway structures and the area backfilled with clean sand. Post-dredge confirmation samples similarly will be collected to assess chemical concentrations of the dredged surface prior to backfilling.

(f) There are three areas-- MW 105, MW113/MW116, and MW 137-- proposed for dredging where the vertical limit of SQO exceedences was not fully defined during the first two rounds of sampling. EPA may require additional dredging and/or capping depending on the results of post-dredge confirmation sampling in these areas. Specific criteria to determine how these decisions will be made will be developed during remedial design.

(g) EPA will ensure that the final plans and specifications for the Middle Waterway cleanup and implementation of the remedy will be coordinated with Simpson to minimize any impacts on Simpson's ongoing operations, as well as with any mobilization or construction work for the Thea Foss remedy.

B. Area B

Selected Remedies

No action is required in most of this area of the waterway except for dredging in SMU 53; the western bank of this SMU will be dredged until all contamination is removed and replaced with a new engineered slope. There is no overall net loss of habitat associated with this cleanup action. No action will be taken in SMU 54.

Enhanced natural recovery is the selected remedy for SMU 55 in the northern portion of the SMU (to address exceedences at MW156, MW158, and MW039) and no action is required in the southern portion of SMU 55. However, the sediments in SMU 55 are part of the area that is planned to be included in the construction of the habitat mitigation required for the St. Paul Waterway nearshore disposal facility. When that mitigation project is constructed, as part of that construction effort, sediments in SMU 55 will be dredged and disposed at a suitable disposal site. Once that occurs, this SMU will no longer need to be monitored for enhanced natural recovery.

Figure 2 indicates the locations of all the SMUs in Middle Waterway, and Appendix B identifies the selected remedy for each SMU.

C. Area C

Selected Remedies

The remedies selected for this area are enhanced natural recovery in SMU 51b and no action within SMUs 52a and 52b other than removing the pile of roofing material located at MW008-SP. For SMU 51a, EPA elects to address surface contamination with enhanced natural recovery, to leave the subsurface contamination in place, and to require extensive monitoring. Appropriate institutional controls will also be required and will be specified during remedial design as part of an overall plan for institutional controls in Middle Waterway. Remedial actions selected for SMU 51a must meet the performance criteria previously established in the Commencement Bay ESD dated August, 2000, and achieve the SQOs within the predicted ten-year timeframe. As with any contamination left in place, the PRPs will remain potentially liable for further cleanup of the subsurface contamination should conditions change and it presents a threat to human health or the environment. Long-term monitoring for SMU 51a will include but not be limited to regular sampling and chemical analysis of sediments as well as surveying and inspection for any sign of changed water flow patterns, erosion of sediment, colonization by marine species capable of transporting subsurface contamination to the surface, impacts to existing restoration areas, biological testing or other indications of increased risk of potentially unacceptable exposure of the subsurface materials.

EPA's selection of enhanced natural recovery in SMUs 51a and 51b also assumes that channel

armoring or other extensive erosion protection measures will not be required to avoid potential exposure of the subsurface contamination. Evidence of failure of the remedy or a need for additional habitat restoration or mitigation actions that could lead to exposure of subsurface contaminated materials will signal the need for more vigorous or frequent monitoring. The presence of subsurface contamination in SMU 51a does not prevent future restoration or mitigation efforts in this area. Any future changes that will negatively impact the effectiveness of the remedy or any evidence of remedy failure will lead EPA to evaluate more active remediation options.

Due to the high levels of contamination and circumstances surrounding SMU 51a, below is a summary of key considerations involved in the remedy selection process for SMU 51a:

Surface sediments in SMU 51a are contaminated primarily with PAHs and mercury at levels above the SQOs. The maximum concentration for mercury found in the surface sediments in this location was 2.26 mg/kg (the SQO is .59 mg/kg) and the maximum concentration for dibenzo(a,h)anthracene found in this location was .65 mg/kg (the SQO is .23 mg/kg). Modeling predicts that placement of a 10 cm or more layer of clean material will be successful in maintaining levels of chemicals below the SQO in the top 10 cm of SMU 51a, and that levels below the SQOs would be sustained for at least 50 years. The key assumptions in the modeling include no ongoing sediment deposition and no ongoing erosion. In support of these assumptions, photographs taken approximately 60 years ago show channels that are virtually unchanged. To minimize change in the existing Area C habitat at the head of the Waterway, material used for enhanced natural recovery will be similar to existing sediments.

SMU 51a is also marked by high levels of PAH and metals contamination in the subsurface. The maximum measured concentrations of HPAHs and LPAHs in Area C are found at a depth of approximately 3 to 5 feet below the sediment surface. These maximum concentrations are 983 mg/kg and 3,483 mg/kg, exceed SQOs by factors of approximately 58 and 670. In comparison, the maximum HPAH and LPAH exceedance factors measured in surface sediment samples collected throughout Area C are approximately 4 and 6. Within a lateral distance of 300 feet the maximum subsurface results, the maximum measured HPAH and LPAH exceedance factors are less than 3. As discussed in the August 2000 ESD, any cleanup plan must protect against exposure of subsurface contamination in the future. For subsurface contamination to remain in place, it must either be present at such low levels that it would not present a risk if it were exposed (not the case at SMU 51a), or there must be a very low potential for exposure. The data suggest that any tendency for PAHs to rise through the sediments is comparatively limited and therefore there is a low potential for exposure. PAHs have a general tendency to adsorb to particulate matter; the fine-grained sediments in Area C act to cap and contain the subsurface PAH contamination.

The area encompassing SMU 51a is one of the few remaining relatively natural mudflat habitat areas within Commencement Bay. Several habitat restoration projects have been selected for areas within or adjacent to the head of Middle Waterway. All of these habitat enhancements are

in support of the recovery of ESA-listed threatened species (e.g., Puget Sound Chinook salmon and bull trout). Therefore, EPA at the time the initial plans for remedial action were being considered, EPA was concerned about potential exposure of subsurface contamination to this habitat area. Initial plans called for the introduction of a freshwater source at the head of Middle Waterway as part of the St. Paul habitat mitigation project. Were that to happen, the likelihood of exposure of the contaminated subsurface sediments from scouring would be very high and therefore the subsurface material would have to be removed. However, based on recent information submitted by the City of Tacoma, the freshwater delivery system will not be located at the head of Middle Waterway as originally thought. Instead, the 90% Design submitted in November, 2001, shows the freshwater delivery system will be installed along the eastern shoreline of Middle Waterway and indicates the discharge will be "via diffuser." At this time, EPA has no reason to believe that there will be a single discharge point at the head of the waterway and the threat of scouring is no longer a factor. If there is a significant deviation from this current design plan, EPA will reevaluate the selected remedy for SMU 51a. In addition, the head of the waterway is not an active navigational area-- there is no boat traffic and other than the daily tidal fluctuations, the head of the waterway is a relatively low-energy environment. There is no current exposure pathway associated with the contaminated subsurface sediment in SMU51a; it is relatively isolated, well-contained, and immobile, thus there is very low potential for exposure.

EPA acknowledges that based on public comments, there is strong community support to require removal of the subsurface contamination in SMU 51a. However, leaving the subsurface contamination in place meets EPA's threshold criteria for protection of human health and the environment and compliance with ARARs. Therefore, from a technical and risk perspective EPA believes that removal of the subsurface contamination is not warranted at this time. Removal would certainly provide the most long-term effectiveness and protection, however, the contamination has been encased in this mudflat area for at least 50 to 60 years and evidence suggests that it has not moved or acted as a significant source of contamination to the waterway throughout that time period. If conditions do not change, there is no reason to believe that the subsurface contamination will move or present an exposure risk. In the short term, removal would have pronounced impacts on the unique mudflat environment in the waterway. The logistics of dredging in this area would result in significant short-term impacts to the head of the waterway. Existing restoration areas which have recently been completed would in all likelihood be disturbed, if not severely damaged. Since there is no exposure pathway for the subsurface sediments, containment of the sediment in place will result in protection to the surrounding restored habitat without short-term construction impacts. Both removal and enhanced natural recovery would have similar adverse impacts on the benthic community at the head of the waterway. However, the recovery time for ENR is also likely shorter than for dredging and backfilling since the thin layer of material placed for ENR will gradually mix with the existing underlying sediment, so organic enrichment should be reestablished more rapidly than with a thick layer of new material. Based on the assumptions used by MWAC in the "Evaluation of Remedial Options Report" dated April 9, 2001, it is estimated that dredging and disposal of this contaminated material would cost approximately \$2.9 million dollars. The estimated cost for

leaving this material in place with enhanced natural recovery is approximately \$200,000 plus at a minimum, approximately \$25,000 per year for monitoring. Actual monitoring costs cannot be determined at this time and will depend on the details to be worked out in the Long Term Monitoring Plan. Given the fact that the contaminated sediment is contained, immobile and there is a low risk of future exposure, containment is more cost effective than additional remediation, such as dredging. However, it is possible that long-term monitoring costs could exceed the costs of dredging if other dredging or removal methods were to prove less costly. Overall, leaving the subsurface contamination in place with enhanced natural recovery and monitoring represents the best balance of tradeoffs when all options are compared.

Regular monitoring will be conducted in this area as part of the Long Term Monitoring Plan that will be developed as part of the remedial design. Should monitoring data indicate that any selected remedy is not viable, the need for additional remedial action will be considered. In addition, since contamination will be left on site, CERCLA requires a Five Year Review to ensure that the selected remedies remain protective. The Five Year Review will address issues including but not limited to erosion, chemical contamination levels, biological testing, contaminant movement, bioturbation or other problems that may lead to remedy failure.

D. Middle Waterway Cleanup Areas and Volumes

The total area of the Middle Waterway is approximately 49 acres. Under this cleanup plan, about 10 acres will be dredged yielding an approximate disposal volume of 92,700 cubic yards. 1.5 acres will be dredged and backfilled, .24 acres will be capped, and 4 acres will be monitored for natural recovery and enhanced natural recovery. The estimated cost of this remedy, assuming disposal of dredged sediments at the Blair Slip 1 disposal site is approximately \$12.5 million.

E. Habitat Considerations

Remedial activities in the Middle Waterway would result in temporary and permanent impacts to approximately 14 acres of aquatic habitat. Of this, approximately 7 acres are above -10 Mean Lower Low Water (MLLW) and an equal amount below -10 MLLW. In the areas above -10 MLLW (hereafter, littoral zone), 1.93 acres will be dredged, 1.2 acres will be dredged and capped and/or backfilled, 3.51 acres will receive a cover of clean material for enhanced natural recovery and 0.24 acres will be capped in a 3 foot cap. Included in the 1.93 acres designated for dredging, approximately .29 acres currently above -10 MLLW will be dredged to a depth below -10 MLLW. This is a "berm" area in front of an existing scow shed that has silted in and there is limited access to the shed. Removal of the berm will allow unimpeded tidal flow to additional areas of the waterway that currently traps water. Of the acreage below -10 MLLW, 6.59 acres will be dredged, 0.27 acres will be dredged and backfilled and .44 acres will receive a cover of clean material for enhanced natural recovery.

The resulting substrate would consist of clean imported sand or clean native sediment. These

activities, along with natural recovery, would leave much less contaminated bottom sediment that is expected to result in improved habitat quality throughout the waterway. The bottom sediment exposed by dredging would re-colonize with infauna and epifauna, as would any cap sediment. Dredging and capping activities would cause temporary and localized impacts to water quality in the vicinity of the active equipment during the construction period. In-water work would be conducted during periods when few juvenile anadromous fish are present in the nearshore waters to reduce or eliminate the risk of direct impacts to this important resource. Additionally, provision of soft or organic-rich substrates beneficial to salmonids will be investigated for use as final capping material.

The net effect of these changes to the aquatic ecosystem would be the unavoidable conversion of .29 acres of intertidal habitat to subtidal habitat. However, removal of the berm will allow unimpeded tidal flow to additional areas that currently trap water. This habitat conversion will actually improve the aquatic resource functions of the waterway by improving circulation and access to an adjacent shallow subtidal areas within the scow shed. Habitat quality for the site would improve because of the removal of contaminated sediments.

VI. STATUS OF SOURCE CONTROL

A. Background

The ROD recognized that the sources of contamination throughout the CB/NT Superfund site would have to be controlled before sediment cleanup could be achieved. The cleanup strategy for CB/NT has been to eliminate or reduce ongoing sources of problem chemicals to the extent practicable before implementing in-water cleanup actions. While Superfund is an effective tool to clean up existing contamination, other authorities are needed to address ongoing releases. Several federal, state and local programs were identified as tools to address source control independently of Superfund. In 1989, EPA and Ecology entered into an agreement that identified the Ecology Commencement Bay Urban Action Team (UBAT) as lead for implementing source control actions. Ecology uses many regulatory tools to control sources, including the Model Toxics Control Act (MTCA) to address upland and groundwater sources and pollutant discharge permits under the Clean Water Act to address direct discharges to the waterways. Ecology reports its progress on the control of sources to EPA and consults with EPA on whether source control is sufficient to move forward with in-water clean up actions.

This ESD does not propose any changes to the source control strategy set forth in the 1989 ROD or the 1992 Source Control Strategy. However, additional information is provided below on how the strategy is being implemented at Middle Waterway.

The administrative mechanism used by Ecology to inform EPA of its progress on source control is a series of reports called Milestone Reports issued for each problem area identified in the ROD. There are five types of Milestone Reports and their purpose is as follows:

Milestone 1 - On-going Confirmed Sources Identified. Ecology has investigated and evaluated all potential sources, and identified all on-going, confirmed sources of problem chemicals.

Milestone 2 - Essential Administrative Actions in Place for Major Sources. Ecology has issued administrative actions, such as orders, consent decrees, or permits, to address major sources of problem chemicals in each problem area to ensure that they will be controlled to the extent necessary to prevent sediment recontamination. Major sources are those most directly linked with current sediment impacts.

Milestone 3 - Essential Remedial Action Implemented for Major Sources. Ecology has implemented all of the remedial actions, such as upland soil cleanup, adoption of best management practices, storm drain cleaning, etc., for all major sources. Essential remedial actions are those needed to eliminate or reduce those contaminant sources that are most likely to recontaminate sediments.

Milestone 4 - Administrative Actions in Place for All Confirmed Sources. Ecology has implemented all of the administrative actions discussed under Milestone 2 for all confirmed sources.

Milestone 5 - Remedial Action Implemented for All Sources. All essential source control work under the decrees, orders, or permits has been completed.

To date, Ecology has completed the all of the Milestone Reports for the Middle Waterway. The following section provides more detailed information about completed and on-going source control actions in Middle Waterway.

B. Middle Waterway

Ecology identified one major ongoing source to Middle Waterway sediment contamination: Marine Industries Northwest (boat repair, construction). Essential source control actions have been completed for this facility, as documented in Ecology's milestone reports for Middle Waterway.

Ecology also identified six other ongoing sources of contamination to Middle Waterway sediments. Essential administrative actions (orders, decrees, or permits) are in place to address all of these sources of problem chemicals to Middle Waterway sediments, as documented in Ecology's October 1997 Milestone 4 reports for Middle Waterway. Ongoing sources of sediment contamination from these facilities have been addressed through a variety of permit and cleanup actions, including excavation and/or capping of upland contaminated soils, control of industrial and stormwater discharges, and long-term monitoring programs. Ecology submitted its Milestone 5 report, documenting completion of source control for Middle Waterway sources on December 8, 2000. In accordance with the ROD, Ecology will continue to monitor and evaluate

the effectiveness of source control actions.

VII. SUPPORT AGENCY COMMENTS

The Washington Department of Ecology (Ecology) had the opportunity to review and comment on the draft ESD for Middle Waterway. While the state is generally supportive of most of the selected cleanup remedies for the waterway, Ecology disagrees with EPA's decision to leave subsurface contamination in place in SMU 51a. EPA has included Ecology's comments and responded to Ecology's concerns in the attached Responsiveness Summary.

The Puyallup Tribe also had the opportunity to review and comment on the draft ESD. The primary focus of the Tribe's comments was also on SMU 51a and EPA's decision to leave the subsurface contamination in place at the head of Middle Waterway. The Tribe is not supportive of this action. EPA has included the Tribe's comments and provided responses in the attached Responsiveness Summary.

VIII. AFFIRMATION OF THE STATUTORY DETERMINATION

Considering the new information that has been developed in this ESD and in the Administrative Record, EPA believes that the cleanup plan is and will be protective of human health and the environment, complies with Federal, State and Tribal requirements that are applicable, or relevant and appropriate to this remedial action as identified in the ROD and subsequent ESDs, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for this site. However, because treatment was not found to be practicable, this remedy does not satisfy the statutory preference for treatment as a principle element. Because this remedy will result in hazardous substances remaining onsite above health-based levels, a review will be conducted within five years after commencement of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

IX. PUBLIC PARTICIPATION ACTIVITIES

EPA has held regular public meetings and has issued many fact sheets to update the public on its activities for the CBN/T Superfund site since the ROD was signed in 1989. EPA mailed a fact sheet describing the Middle Waterway draft ESD to 1300 people. A public comment period was held from August 24, 2001, through September 24, 2001. A request for an extension to the comment period was received, and the date to submit public comments was then extended to October 9, 2001. EPA received 80 comment letters during the public comment period. Many letters expressed opposition to leaving the subsurface contamination in place in SMU 51a at the head of the waterway. Several comments were in favor of the selected remedy for SMU 51a. Overall there is general support for the selected remedies throughout the remainder of Middle Waterway. A summary of the comments received during the public comment period and EPA's responses are included in this ESD as Appendix C. This Final ESD can be found at the

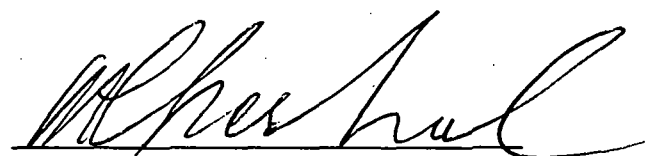
following information repositories:

Tacoma Main Public Library
1102 Tacoma Avenue S.
Northwest Room
Tacoma, WA

Citizens for a Healthy Bay
917 Pacific Avenue
Suite 406
Tacoma, WA

U.S. Environmental Protection Agency
7th Floor Records Center
1200 Sixth Avenue
Seattle, WA

Signed:



Michael F. Gearheard, Director
Office of Environmental Cleanup

2-4-02
Date

Appendices

- A Cost Summaries for the Middle Waterway Remedial Actions
- B Summary of Selected Remedies by Area and SMU
- C Responsiveness Summary

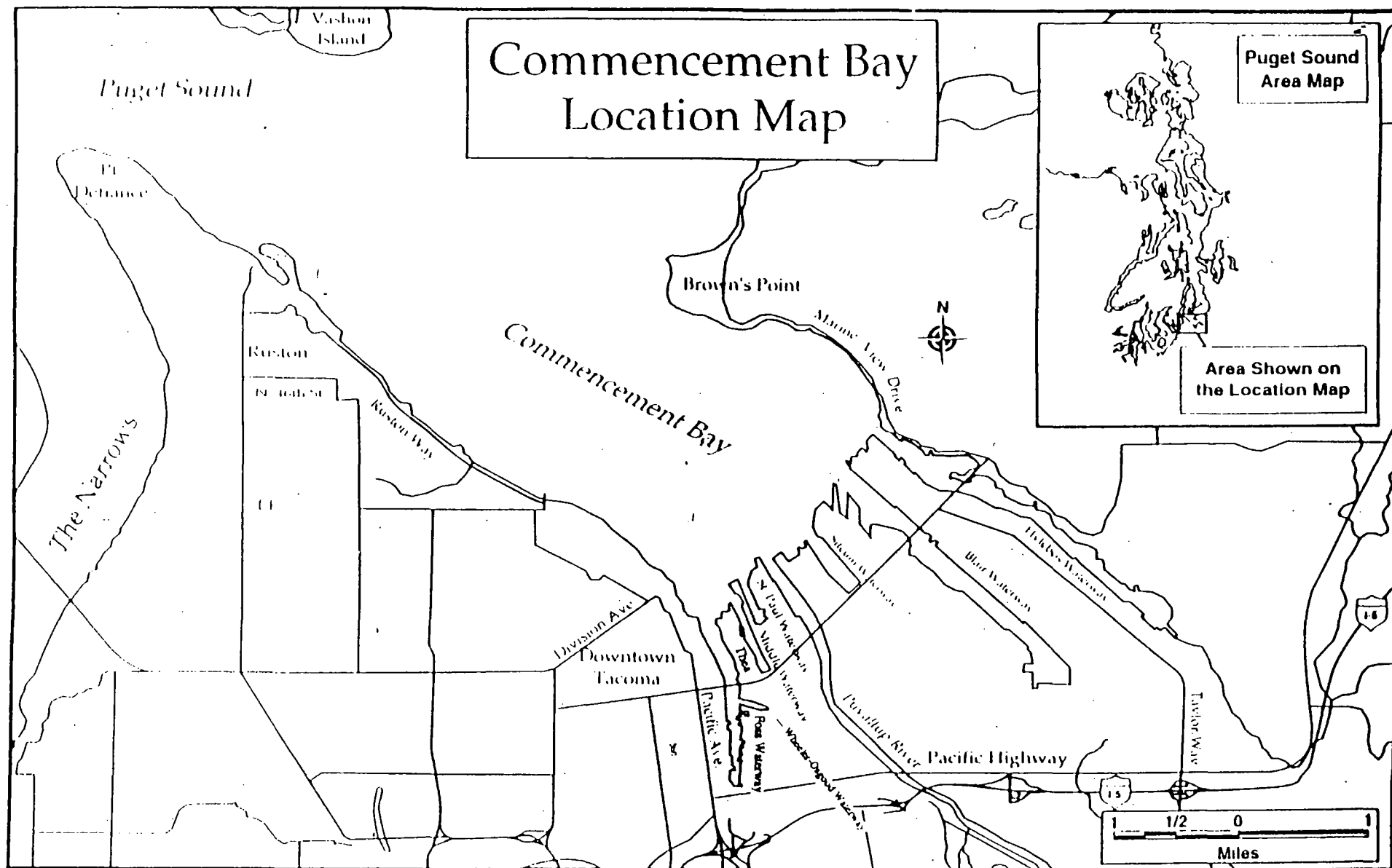
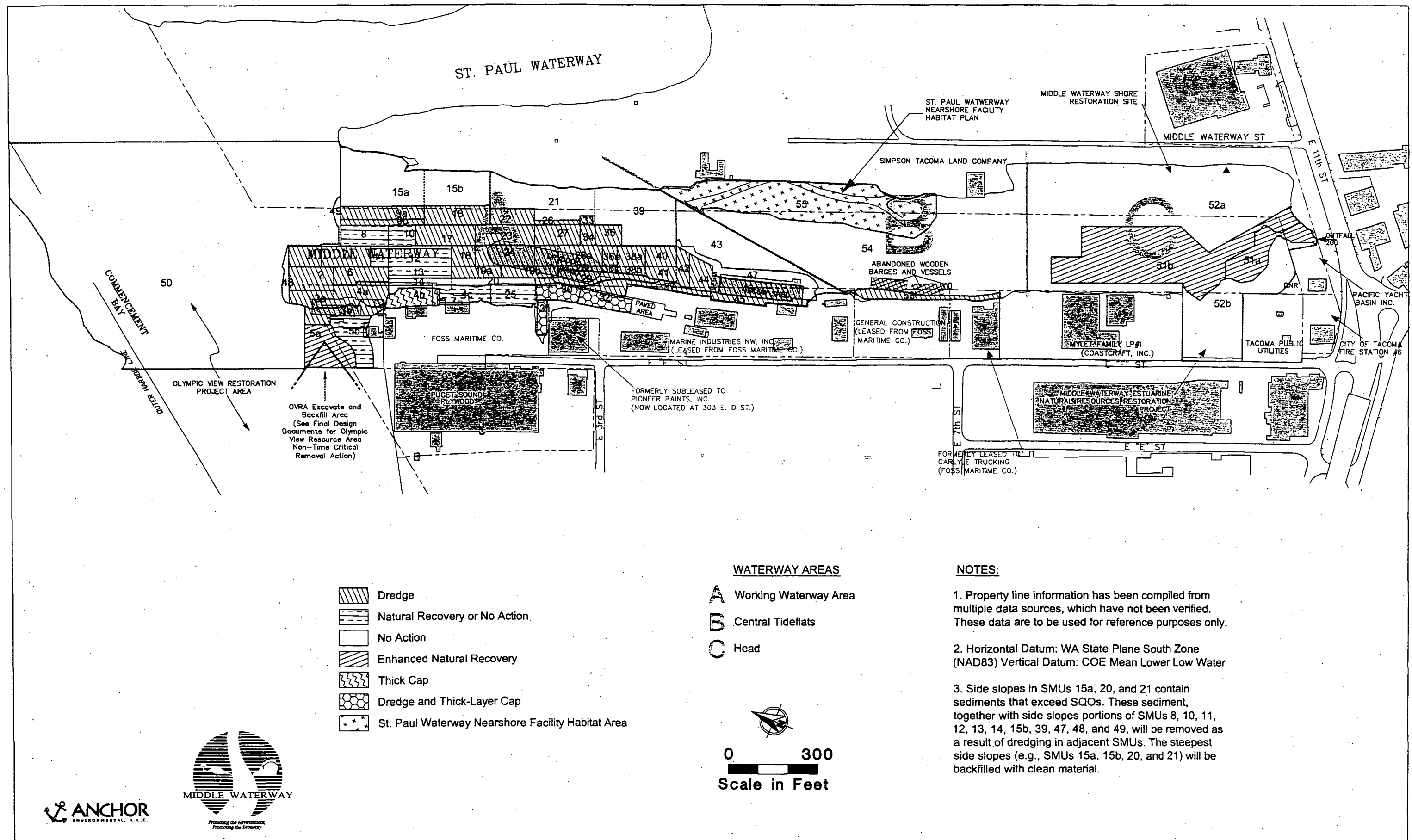


Figure 1



APPENDIX A

Cost Summaries for the Middle Waterway Remedial Action

Table 2. Cost Estimate for Alternative A-2

Item	Unit	Unit Cost	Alternative A-2		
			Quantity	Upland Disposal	Aquatic Disposal
Mobilization/Demobilization	LS	\$ 75,000	1	\$ 75,000	\$ 75,000
Dredge and Transport	CY	\$ 9.50	91,500	\$ 878,400	\$ 878,400
Aquatic Disposal	CY	\$ 40	91,500	\$ -	\$ 3,660,000
Upland Disposal					
Dewater and rehandle	CY	\$ 15	91,500	\$ 1,372,500	\$ -
Transport and Disposal	CY	\$ 45	96,075	\$ 4,323,375	\$ -
Thick Cap (Sand)					
Purchase and Deliver	Ton	\$ 7.75	11,300	\$ 87,575	\$ 87,575
Place	Ton	\$ 6.25	11,300	\$ 70,625	\$ 70,625
Thin Cap (sand)					
Purchase and Deliver	Ton	\$ 7.75	350	\$ 2,713	\$ 2,713
Place	Ton	\$ 6.25	350	\$ 2,188	\$ 2,188
Shore Protection					
Purchase and Deliver	Ton	\$ 10.25	14,280	\$ 146,370	\$ 146,370
Place	Ton	\$ 6.25	14,280	\$ 89,250	\$ 89,250
Structure Demolition	SF	\$ 10.00	40,000	\$ 400,000	\$ 400,000
Structure Rebuild-wooden	SF	\$ 50.00	40,000	\$ 2,000,000	\$ 2,000,000
Sheet Pile	LS	\$ 950,000	1	\$ 950,000	\$ 950,000
Habitat Mitigation	LS	TBD	1	\$ -	\$ -
Subtotal				\$ 10,397,995	\$ 8,362,120
Engineering Design	Percent	10%		\$ 1,039,800	\$ 836,212
Const. Monitoring/Mgmt.	Percent	5%		\$ 519,900	\$ 418,106
Long Term Monitoring	LS	\$ 100,000	1	\$ 100,000	\$ 100,000
Contingency	Percent	30%		\$ 3,119,399	\$ 2,508,636
Total				\$ 15,177,093	\$ 12,225,074

Assumptions: Habitat Mitigation costs to be determined.

Dredged volume based on 81,000 CY based on the depth of maximum SQO exceedence plus one foot of clean sediment and a 10,000 CY overdredge allowance.

Mechanical dredging with a 12 CY digging bucket (production rate of 1,500 CY/Day).

Three 1,500 CY haul barges used.

Two tug boats dedicated to project.

Prices for sand, gravel, and shore protection material from LoneStar Industries

Minimal decons will be encountered

Thick Cap in SMUs 4b, 30, 31, and 32.

Clean backfill placed in SMUs 3a, 3b, and 4a

Shore protection at toe of slope in SMUs 15a, 15b, 20, and 21

Aquatic Disposal is a delivered cost and includes, design construction compensatory mitigation and long-term monitoring.

Dewatering costs based on Port of Seattle East Waterway project

Five percent time added during dewatering process

Upland disposal in Subbde D landfill

Long-Term monitoring based on \$25,000 per event, one event every 2 years, i = 7%, e = 3%

Long-term monitoring does not include monitoring at disposal site.

Long-term monitoring at the disposal facility is included in the aquatic disposal unit cost.

Structure demolition and rebuild costs from Ron McCray, General Construction

Sheet pile costs based on Sitts & Hill estimate.

This cost estimate is in present day (2000) dollars

Aquatic disposal costs are based on disposal in Blair Slip 1

Notes: Aquatic disposal costs are estimated based on preliminary discussions with the Thea Foss PRPs, the Port of Tacoma, and Occidental Chemical Corporation. These costs are subject to revision and are included for cost comparison purposes only.

CY = Cubic Yard

LS = Lump Sum

SF = Square Foot

TBD = To Be Determined

Table 3. Cost Estimate for Alternative B-1

Item	Unit	Unit Cost	Alternative B-1		
			Quantity	Upland Disposal	Aquatic Disposal
Mobilization/Demobilization	LS	\$ 10,000	0	\$ -	\$ -
Dredge and Transport	CY	\$ 5.03	1,200	\$ 6,036	\$ 6,036
Rehandling	CY	\$ 3.00	1,200	\$ 3,600	\$ 3,600
Aquatic Disposal	CY	\$ 40	1,200	\$ -	\$ 48,000
Upland Disposal					
Dewater and rehandle	CY	\$ 15	1,200	\$ 18,000	\$ -
Transport and Disposal	CY	\$ 45	1,200	\$ 54,000	\$ -
Shore Protection					\$ -
Purchase and Deliver	Ton	\$ 13.00	1,680	\$ 21,840	\$ 21,840
Place	Ton	\$ 8.50	1,680	\$ 14,280	\$ 14,280
Habitat Mitigation	LS	TBD	1	\$ -	\$ -
Subtotal				\$ 117,756	\$ 93,756
Engineering Design	Percent	10%		\$ 11,776	\$ 9,376
Const. Monitoring/Mgmt.	Percent	5%		\$ 5,888	\$ 4,688
Monitoring	LS	\$ 15,000	1	\$ 15,000	\$ 15,000
Contingency	Percent	30%		\$ 35,327	\$ 28,127
Total				\$ 185,746	\$ 150,946

Assumptions: Habitat Mitigation costs to be determined:

Prices for shore protection material from LoneStar Industries.

Mobilization/demobilization included in Alternative A-1 or A-2.

Dredged material will be rehandled on to barges and disposed of in an aquatic site.

Dewatering costs based on Port of Seattle East Waterway project

Aquatic Disposal is a delivered cost and includes, design construction compensatory mitigation and long-term monitoring.

Upland disposal in Subtitle D landfill.

Monitoring based on a one-time monitoring event.

Monitoring does not include long-term monitoring at disposal site.

Long-term monitoring at the disposal facility is included in the aquatic disposal unit cost.

This cost estimate is in present day (2000) dollars.

Aquatic disposal costs are based on disposal in Blair Slip 1

Notes: Aquatic disposal costs are estimated based on preliminary discussions with the Thea Foss PRPs, the Port of Tacoma, and Occidental Chemical Corporation. These costs are subject to revision and are included for cost comparison purposes only.

CY = Cubic Yard

LS = Lump Sum

SF = Square Foot

SF = Square Foot

TBD = To Be Determined

Table 2. Cost Estimate for Alternative C-1

Item	Unit	Unit Cost	Alternative C-1	
			Quantity	Extended Costs
Mobilization/Demobilization	LS	\$ 10,000	1	\$ 10,000
Dredge and Transport	CY	\$ 9.50		\$ -
Rehandling	CY	\$ 3.00		\$ -
Aquatic Disposal	CY	\$ 40		\$ -
Thick Cap (Sand)				\$ -
Purchase and Deliver	Ton	\$ 7.75		\$ -
Place	Ton	\$ 6.25		\$ -
Thin Cap (sand)				\$ -
Purchase and Deliver	Ton	\$ 7.75	3,500	\$ 27,125
Place	Ton	\$ 6.25	3,500	\$ 21,875
Shore Protection				\$ -
Purchase and Deliver	Ton	\$ 10.25	250	\$ 2,563
Place	Ton	\$ 6.25	250	\$ 1,563
Habitat Mitigation	LS	TBD	1	\$ -
Subtotal				\$ 63,125
Engineering Design	Percent	10%		\$ 6,313
Const. Monitoring/Mgmt.	Percent	5%		\$ 3,156
Long Term Monitoring	LS	\$ 100,000	1	\$ 100,000
Contingency	Percent	30%		\$ 18,938
Total				\$ 191,531

Assumptions: Habitat Mitigation costs to be determined.

Removal of the pile of roofing material at MW008-SP is considered negligible.

Prices for sand, gravel, and shore protection material from LoneStar Industries

Long-Term monitoring based on \$25,000 per event; one event every 2 years; i = 7%; e = 3%

Long-term monitoring does not include monitoring at disposal site.

Long-term monitoring at the disposal facility is included in the aquatic disposal unit cost.

This cost estimate is in present day (2000) dollars.

Notes: CY = Cubic Yard

LS = Lump Sum

SF = Square Foot

TBD = To Be Determined

APPENDIX B

Summary of Selected Remedies by Area and SMU

Selected Remedies in Middle Waterway

AREA	SMU	REMEDIAL ACTION
A	1	Dredge
A	2	Dredge
A	3a	Dredge
A	3b	Dredge
A	4a	Dredge
A	4b	Thick Cap
A	4c	Natural Recovery
A	5a	Enhanced Natural Recovery
A	5b	Natural Recovery
A	6	Dredge
A	7	Dredge
A	8	Natural Recovery
A	9a	Dredge
A	9b	Dredge
A	10	Natural Recovery
A	11	Natural Recovery
A	12	No Action
A	13	No Action
A	14	No Action

AREA	SMU	REMEDIAL ACTION
A	15a	Dredge/No Action
A	15b	Dredge/No Action
A	16	Dredge
A	17	Dredge
A	18	Dredge
A	19a	Dredge
A	19b	Dredge
A	20	Dredge/No Action
A	21	Dredge/No Action
A	22	Dredge
A	23	Dredge
A	24	Dredge
A	25	Natural Recovery
A	26	Dredge
A	27	Dredge
A	28a	Dredge
A	28b	Dredge
A	29	Dredge
A	30	Dredge/Cap

AREA	SMU	REMEDIAL ACTION
A	31	Dredge/Cap
A	32	Dredge/Cap
A	33	Dredge
A	34	Dredge
A	35	Dredge
A	36a	Dredge
A	36b	Dredge
A	37	Dredge
A	38a	Dredge
A	38b	Dredge
A	39	No Action
A	40	Dredge
A	41	Dredge
A	42	Dredge
A	43	No Action
A	44	Dredge
A	45	Dredge
A	46	Dredge
A	47	Dredge

[illegible]

APPENDIX C

RESPONSIVENESS SUMMARY

Responsiveness Summary

Overview

The purpose of this Responsiveness Summary is to present and respond to public comments submitted to EPA on the draft Middle Waterway Explanation of Significant Differences (ESD) to the Record of Decision (ROD) for the cleanup of the Commencement Bay Nearshore/Tideflats Superfund site. This Responsiveness Summary has been prepared in accordance with Section 117 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and July 1999 guidance document entitled *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents* (EPA 540-R-98-031). The public comment period was held from August 24 to September 24, 2001, and then extended to October 9, 2001. During the public comment period, 80 comment letters were received from citizens along with comments from the Puyallup Tribe, city and state representatives as well as from federal resource agencies.

Most comment letters were generally supportive of EPA's proposed remedies for the waterway with one exception in SMU 51a. The most controversial aspect of the draft ESD was EPA's proposal to leave subsurface contamination in place at SMU 51a. While many commentors felt that this decision was unacceptable, EPA also received a number of comments in support of leaving the subsurface contamination in place. EPA has not made changes to the selected remedy for SMU 51a in response to the comments received. No new technical or other information was provided that would fundamentally alter EPA's evaluation of the need for removal of the subsurface contamination under CERCLA. Minor modifications pertaining to clarifications and additional information have been made to the ESD in response to public comments.

Comments that were critical of EPA's proposed remedy along with comments pointing out the need for further requirements or information in the ESD are presented below in their entirety, however, they have been divided and organized according to topics. The originator of the comment is noted at the end of each comment. EPA received more than 60 letters supporting and reiterating comments submitted by Citizens for a Healthy Bay (CHB), however, for purposes of this Responsiveness Summary, only the CHB comment letter is cited. Regarding the format of the Responsiveness Summary, in some cases, one response may be provided to address several comments that have been grouped together, or there may be a single response to a single comment. EPA is not providing individual responses to comments received in support of the ESD, however, all comment letters can be found in the Administrative Record.

I. Selection of Remedy for Area A

1. Comment: SMU's 5a and 5b. Ecology remains concerned regarding the selection of Natural Recovery (NR) and Enhanced Natural Recovery (ENR) for these SMU. The issues relayed in Ecology's comment letter of August 31, 2000, were not resolved through the MWAC response to EPA's comments (Appendix F, Final Data Evaluation Report, Revised April 9, 2001). The

concerns initially raised by Ecology focused on these SMU being in an intertidal, high energy, erosional environment which is not conducive to NR or ENR. This is confirmed by the low fines content and TOC, but especially by the erosion observed in the first six months after placement of an intertidal sand cap at Simpson's project on the adjacent peninsula tip. At each of five transects, erosion was equal to or greater than 10 cm (0.3 feet) at one or more stations with up to 1 foot of erosion having occurred at two of the transects. Overall, erosion occurred at 61% of the 28 stations observed. Conditions necessary for NR or ENR to be considered are a low energy, accretional environment in which existing contamination or capping material are not subject to erosional forces. The 5a and 5b SMU do not meet these conditions and ENR capping material placed in this environment would be subject to rapid erosional loss rather than being incorporated into an accretional, bioturbation-mediated recovery scenario. MWAC's modeling effort would be valid in a quiescent, low current/energy environment which these SMU are not.

MWAC referred to an alternative approach using biological testing to confirm whether the SQO exceedances in these SMU are truly predictive of biological hits. Provided active remediation of the sediments would occur if hits are encountered, this would be a preferred approach compared to the proposed NR and ENR. (*Ecology*)

2. Comment: Waterway Area A - The ESD must provide certainty that active remedial action will be performed in SMU 5a and 5b, which abut the Olympic View NRDA habitat restoration site, which is scheduled for active remediation in 2002. The ESD fails to address the fact that the proximity of SMUs 5a and 5b to Olympic View requires that similar cleanup goals and standards must logically be applied in order to preserve the value of critical nearshore and intertidal that OVRA is meant to provide.

In providing comments to EPA on the OVRA EE/CA, CHB urged EPA to expand the active remediation area to include metals contamination identified in these segments. EPA's response to this comment was that these areas would be addressed in the Middle Waterway remedial action.

MWAC is hopeful that a working arrangement with the Commencement Bay NRDA Trustees can be reached to begin construction of a habitat restoration area at this location, which would result in the removal of the metals contamination. CHB supports MWAC's proposed habitat restoration project and hopes that a mutually agreeable temporary understanding can be achieved between MWAC and the NRDA Trustees to allow the construction of the site to go forward prior to a final natural resources damage settlement between the parties.

CHB's concern is that the on-site metals contamination is removed, whether by active remediation under CERCLA or as part of the construction of a habitat restoration area. The ESD must specify removal of contaminated sediments from SMU 5a and 5b in order to assure continuity between the Middle Waterway and OVRA sites. (*CHB*)

Response to Comments 1 and 2: To portray a more accurate picture of SMU5a, the ESD has been revised to show that approximately 30% of SMU5a will be excavated and backfilled as part of the Olympic View Resource Area (OVRA) removal action. The OVRA-related cleanup in SMU 5a will address the location of one of the mercury exceedances in SMU 5a. Previously, the

boundary of SMU 3b was moved so sediments associated with sampling location 30-S, formerly located in SMU 5a, are now included in SMU 3b. Thus, the sediments associated with 30-S will be dredged along with the rest of SMU 3b. The mercury exceedance in the remainder of SMU 5a is considered to be relatively minor and enhanced natural recovery is predicted to be sufficient to reduce concentrations and meet the SQOs.

EPA generally disagrees with Ecology's assessment that SMU 5a is a high energy area susceptible to rapid erosion. A review of existing conditions in the area of the OVRA removal action was performed by the City of Tacoma in preparation for the design of the removal action for that site. Area C of the OVRA site includes a portion of Middle Waterway's SMU 5a (see Engineering Evaluation/Cost Analysis for the Olympic View Resource Area Removal Action dated April 30, 2001). Silty sand was reported to have been observed throughout most of the intertidal area, both on the surface and in test pits. These observations of pervasive relatively fine-grained materials were interpreted as an indication that the area is not subjected to highly erosive forces or scour capable of causing net material loss. An analysis of potential erosion and scour effects from wind and wave action, including use of the Automated Coastal Engineering System model and consideration of potential propeller wash, was also performed in conjunction with the design of the OVRA removal action. Based on these observations and analyses, the OVRA action selected for the area included in SMU 5a consists of removal of shallow sediments to a depth of slightly more than a foot and backfilling with clean sand. The remedy proposed by MWAC for the remainder of SMU 5a is to place an estimated 10 cm layer of clean fine-grained material, with the goal that this new material will gradually mix with the existing materials and reduce the existing chemical concentrations. This remedy appears to be wholly consistent with the action planned in that part of SMU 5a included in Area C of the OVRA removal action.

In early 2002 additional biological testing and sediment chemistry using sediments from SMU 5b is planned in order to confirm the selection of natural recovery with monitoring as the remedy for SMU 5b. EPA will consider additional action if the sampling indicates natural recovery is not the appropriate remedy.

3. Comment: Waterway Area A - The ESD must mandate that verification monitoring confirms EPA's position that overall function of aquatic habitat will be improved by the removal of the berm in SMU 44 or that 0.29 acres of converted habitat as a result of the removal of the berm will be fully mitigated.

CHB does not dispute the premise that EPA has made in this regard, but asserts that the benefit to the aquatic environment that is anticipated to be achieved by removal of the berm is verified by sound science. Without a monitoring component to substantiate the improvement to the overall aquatic habitat, EPA risks establishing a precedent elsewhere in Commencement Bay by allowing habitat conversion to stand unmitigated when conducted in sediment remediation.
(CHB)

Response to Comment 3: The long term monitoring plan will also include a component to monitor overall aquatic habitat improvement throughout the waterway, including SMU44. For additional discussion of long-term monitoring in Middle Waterway see responses to comments

21, 49, 63 and 64.

4. Comment: Figure 2 and Appendix B. The draft ESD and Final Evaluation of Remedial Options Report (November 2000) do not provide cross-sections of detailed information on the dredge prism and the effect of no action/natural recovery on navigation in SMUs 8 and 10-14, which is the active public navigational portion of the waterway.

As the EPA Superfund program is aware, the St. Paul CDF is designed to accommodate reestablishment of a future commercial dock at the end of Middle Waterway in SMU 15a and possibly SMU 50. Simpson or future property owners, in cooperation with DNR or other agencies, might need to deepen portions of the mouth of Middle Waterway for navigation.

Please confirm that the selected remedy will remove contaminated sediments from the mouth of Middle Waterway within the natural recovery timeframe to avoid reopening the remedy or requiring special handling or disposal of any sediments, should there be a need for future navigational dredging of this public waterway. (*Simpson*)

5. Comment: Waterway Area A - The ESD designates SMU 50 as a No Action area, however the proposed remedy fails to consider the future need for navigational dredging to accommodate the reestablishment of a commercial dock planned at the end of Middle Waterway. As a result of the commercial dock, Simpson, in cooperation with DNR, may need to deepen portions of the mouth of Middle Waterway to accommodate navigation.

The final remedy must remove both surface and sub-surface contaminated sediments from the mouth of Middle Waterway to accommodate the need for future navigational dredging of this public waterway. (*CHB*)

Response to Comments 4 and 5: Existing data for SMUs 50 and 15a of the waterway are somewhat limited. These data, including data collected as part of the Middle Waterway pre-remedial design investigations, show very little justification for active sediment remediation in this area. Limited surface sediment exceedances of chemical SQOs at MW022 are overridden by positive biological test results. The side slope of SMU 15a, potentially contaminated based on the closest sampling results from MW027, will be removed in connection with dredging planned in adjacent SMU 9a. In general the data suggest that any navigation dredging needed in the future in this area is not likely to be impacted by contaminated subsurface sediments. In the unlikely event that future dredging uncovers conditions posing a threat to human health or the environment, EPA will reconsider the need for active remediation.

II. Selection of Remedy for Area B

6. Comment: Section V.B (page 8) inappropriately identifies two different selected remedies for SMU 55. One, based on habitat mitigation/restoration use, calls for dredging and disposal. The second, based on the habitat plan not being constructed, calls for enhanced natural recovery.

The ESD should be revised to provide for one remedy. The existing Middle Waterway remnant

tideflat is high quality functioning habitat and should have the same level of cleanup, regardless of whether the habitat plan for Thea Foss Waterway is implemented. As page 10 of the draft ESD notes, this tideflat area "is one of the few remaining relatively natural mudflat habitat areas within Commencement Bay." If EPA determines that enhanced natural recovery and no action are adequate, then this should be the selected remedy for SMU 55.

The ESD should delete the third sentence of the second paragraph on page 8. We suggest the following text: "If implementation of the approved habitat plan for the Thea Foss cleanup involves deepening the contours of SMU 55 at MW156, MW 158, or MW039, the ESD also approves of dredging and disposal of these areas to facilitate the habitat plan, including disposal in the St. Paul CDF or other suitable disposal site." This last clarification is important to avoid future delays in Commencement Bay remedial actions.

Section V.B (page 8, paragraph 2) should then note for clarity in the second sentence: "...as part of that construction effort, the party or parties responsible for constructing the CDF and associated habitat as part of the Thea Foss Waterway cleanup will perform the sediment remediation in SMU 55." (*Simpson*)

7. Comment: Waterway Area B - The ESD inappropriately selects two disparate remedies for SMU 55. One, based on habitat mitigation/restoration use, calls for dredging and disposal. The second, based on the habitat plan not being constructed, calls for enhanced natural recovery.

The ESD needs to be revised to provide for one remedy that will assure a permanent and protective solution to the contaminated sediments in this SMU. (*CHB*)

Response to Comments 6 and 7: Several commentors noted that it appeared that the ESD was selecting two separate remedies for SMU 55. This was not EPA's intention and the ESD has been revised to clarify the fact that enhanced natural recovery is the selected remedy for SMU 55. However, at this time, it appears that the habitat mitigation project for Thea Foss Waterway will proceed and therefore, sediments from SMU 55 will be dredged and disposed as a result of that activity, thereby eliminating the need for enhanced natural recovery in this SMU.

III. Selection of Remedy for Area C

8. Comment: The proposed remedy change for Sediment Management Unit 51 a (SMU 51 a) is insufficiently protective of the environment. There has been considerable effort expended on the restoration of this portion of the Commencement Bay Nearshore/Tideflats Superfund site. The proposed remedy change will leave large quantities of persistent, bio-accumulative and toxic chemicals in a critical portion of the waterway's unique mudflat environment. The long-term benefit of removing this material may significantly exceed any short-term disruptions to the mudflats or current restoration projects. (*Ecology*)

Response: EPA fundamentally disagrees with the statement that the selected remedy for SMU 51a is insufficiently protective of the environment. The Data Evaluation Report (DER) prepared in accordance with the Administrative Order on Consent (AOC) and approved by EPA provided a full assessment of the nature and extent of contamination in Middle Waterway including

assessment of sediment toxicity with respect to potential biological effects, assessment of habitat distribution and resource use, and assessment of sediment contaminant mobility. EPA acknowledges that the selected remedy will leave contaminated subsurface sediments in place at the head of the waterway. The decision is based on a thorough analysis of the data, which indicates that: (1) there is no current exposure pathway that creates a risk to human health or the environment from this subsurface contamination; (2) that it is not acting as a significant source of contamination to the waterway; (3) that it is contained and not mobile; and (4) that the surrounding areas are not being adversely impacted by the existence of this contamination at depth. It is not certain where the material came from or how long it has been there, but estimates based on anecdotal information are that this contaminated material has been encased in the mudflat for perhaps 50 to 60 years. However, high levels of PAHs have not been found at the mouth of the waterway nor has this subsurface contamination been exposed to the surface during this time by tidal action, erosion, storm events, navigational activities or mishaps. As long as current conditions persist, there is a strong likelihood that the contamination will remain where it is and will not cause adverse impacts to habitat or other resources in the waterway. In the meantime, a monitoring program will be designed and implemented to track if indeed conditions are changing that will require more active remediation.

EPA acknowledges that there could be long-term benefits associated with removal of this contaminated material. Long-term effectiveness is one of the nine criteria Superfund uses to evaluate cleanup decisions. However, it is likely that these benefits would be minor because, as noted above, the subsurface contamination has been trapped in the fine-grained sediments at the head of the waterway for many years and there is no evidence to suggest that it is a significant source of contamination in Middle Waterway. On the other hand, remediation of this material could have negative short term effects and increase the cost of the cleanup. In this case, EPA has determined that based on the data and other factors related to conditions in Middle Waterway, the decision to leave the contaminated subsurface sediments in place represents the best balance of tradeoffs when compared to other options.

If the Natural Resource Trustees believe that for other reasons, e.g. relating to habitat and resource use, they would prefer to remove this subsurface contamination, EPA would like to point out that NRDA settlement monies can be used for cleanup purposes in conjunction with restoration projects independent of any determination by EPA. EPA would be happy to work with the Trustees to provide support, coordination and legal assurances deemed necessary if they were to undertake such action.

9. Comment: Based on our review of this document, the Puyallup Tribe does not concur with the described plans for cleanup. The Puyallup Tribes concerns are based on the following issues:

SMU 51(a). The proposed change for this SMU will leave large quantities of persistent, bio-accumulative and toxic chemicals at the head of the waterway.

As you are aware, the Natural Resource Trustees, Simpson Tacoma Kraft Co. and the City of Tacoma have spent millions of dollars to restore habitat in close proximity to the critical mudflat environment.

The proposal to leave 10,000 cubic yards of PAH contaminated sediment in place and then cover

the sediment with fine material is totally unacceptable.

Despite the call for future monitoring and contingency plans, the tribe has no confidence that future cleanup will occur in a timely fashion. Past experience has shown that the bureaucratic and political processes delay cleanup for decades. As consequence, biological harm to the environment and to natural resources of the Tribe will be at risk. Furthermore, the future cost to cleanup this area will dramatically increase.

The Tribe does not agree with EPA's concern over the possible short-term risk to restoration sites from a land based remedial action. We believe that the risk of damage to these sites is much greater by leaving contamination in place. Failure of your "do nothing" remedy jeopardizes the potential success of restoring injuries to natural resources and may create an attractive nuisance. The proposed freshwater delivery system as a component of habitat restoration is still being evaluated. By leaving contamination in place reduces the likelihood that a freshwater source will be located at the head of the waterway. (*Puyallup Tribe*)

Response: EPA understands that the Tribe does not support the proposal to leave the subsurface contamination in place at the head of Middle Waterway. However, EPA disagrees with the assertion that this is a "do nothing" remedy. SMU 51a represents only a small portion of the waterway. Active remediation will take place throughout Middle Waterway. There will be dredging and disposal of over 90,000 cubic yards of contaminated sediments and areas of Middle Waterway will be covered with both thick and thin layer caps. A long-term monitoring program will be developed as part of the remedy design that will monitor for evidence of significant erosion, changes in chemical concentrations, and indications of contaminant movement. In addition, in accordance with CERCLA, Middle Waterway will be subject to Five Year Reviews to determine if the selected remedies remain protective. If significant changes are identified that result in the remedy no longer being protective, the need for additional cleanup work will be evaluated. If any change occurs whereby the subsurface contamination becomes an imminent and substantial threat, EPA can use its emergency removal authorities to streamline bureaucratic and political processes to ensure any necessary cleanup would happen in a timely fashion.

On balance, when the full response is considered, the selected remedy is protective of human health and the environment and the overall environmental condition of Middle Waterway will be greatly enhanced. There is no evidence that the subsurface contamination at the head of the waterway is causing biological harm to the environment. It is encased in the mudflat and there is no evidence that it is mobile, that it is impacting the restoration sites, or that there is an exposure pathway that would create risks to humans or to fish in the waterway.

Regarding the location of the proposed freshwater delivery system for the St. Paul habitat mitigation project, the 90% Design submitted by the City of Tacoma in November, 2001, shows the planned freshwater delivery system "via diffuser" will be installed along the eastern shoreline of Middle Waterway, and therefore is not expected to cause erosional impacts in the SMU 51a area.

10. Comment: SMU 51a and 51b. The nature and extent of contamination of these SMUs warrant dredging and removal. This will ensure long term protection is achieved and that the remedy is compatible with the planned habitat restoration for this area. The model predictions

for enhanced natural recovery (or predicted surface concentrations after cap placement) assume a quiescent, low energy, subtidal site, whereas the actual cleanup site is in a very dynamic intertidal environment, that experiences tidal inundation twice daily. This will contribute to pore water movement that can drive contaminant migration in excess of those predicted by simple diffusion and/or bioturbation. Also, proposed enhanced natural recovery capping may serve to enhance colonization by the burrowing shrimp (*Neotrypea californiensis*) whose feeding and burrowing activities would result in direct exposure to contaminants as well as deposition at the surface of contaminated sediments from depth. (*Ecology*)

11. Comment: Ecology does not believe that the fine material used in the “enhanced natural recovery” capping will be stable. It likely will be eroded away by wave action (especially storm-driven wave action) and tidal action. A form of scouring will occur whether or not the freshwater diversion channel is located at the waterway head.

Comparing aerial photographs of channel boundaries over time is too gross a method to reveal erosion at the scale of inches that represents the biologically active zone of the channel bottom.

Erosion will occur with the dredging alternative as well - but of course, there will be no contaminants to be exposed with this option.

Please note that if the “enhanced natural recovery” remedy fails that failure will not likely be apparent for 10 to 15 years. Fifteen years from now, all the problems associated with the dredging alternative (reluctant PRPs, nebulous funding, etc.) will remain, but the possibility of a cheaper land-based operation will have evaporated.

Ecology urges EPA to reconsider the remedy change proposed in the draft ESD and reconsider the more permanent dredging alternative. (*Ecology*)

12. Comment: The reliance on natural recovery as an important component of sediment remediation is without merit and should not be considered as an effective or protective remedy. Although EPA expects these areas of marginally contaminated sediments to recover within 10 years after sediment remediation and that subsequent monitoring will be required, the Tribe has little confidence that natural recovery will work. If natural recovery fails additional cleanup will cost more; require another arduous regulatory process; requires another disposal site and most importantly continue injury to aquatic resources. Additionally, future development, propeller scour, maintenance dredging, tidal action and currents will only exasperate natural recovery. (*Puyallup Tribe*)

13. Comment: Subsurface contamination needs to be reevaluated. These sediments if left in place may adversely impact natural resources or become the reservoir for recontamination. All subsurface contamination within the active channel should be removed as part of the sediment remedy. This action will allow for expedited maintenance dredging in the future without the need for expensive time consuming regulatory processes and most importantly the need for more disposal sites in Commencement Bay. (*Puyallup Tribe*)

Response to Comments 10 through 13: The primary potential threat in Area C of Middle Waterway is associated with subsurface sediment PAH contamination. Based on the results of

field investigations and other information presented in the DER and supporting documents, the highest levels of contamination are confined to a small area. As described below, contaminant levels in shallow undisturbed sediments overlying the higher levels of contamination are much lower than the concentrations measured at depth, implying that there is at most only limited potential for the PAHs to rise through the sediments and reach surface sediments or the water column.

The maximum measured concentrations of HPAHs and LPAHs in Area C are found at a depth of approximately 3 to 5 feet below the sediment surface. These maximum concentrations are 983 mg/kg and 3,483 mg/kg, exceed SQOs by factors of approximately 58 and 670. In comparison, the maximum HPAH and LPAH exceedance factors measured in surface sediment samples collected throughout Area C are approximately 4 and 6. Within a lateral distance of 300 feet of the maximum subsurface results the maximum measured HPAH and LPAH exceedance factors are less than 3. The shallowest sample collected at the location with the maximum subsurface results did not exceed the SQO for either HPAHs or LPAHs. PAHs have a general tendency to adsorb to particulate matter; the existing fine-grained sediments in Area C likely act to cap and contain the subsurface PAH contamination.

The extensive shallow tideflats comprising Area C appear to be well-sheltered from the effects of waves and current under all but comparatively rare conditions. Over 75% of the surface sediment grain-size results summarized in DER Figure 13 were found to consist of over 50% fines; almost 90% of the subsurface sediment grain-size results summarized in Figure 14 had over 50% fines. The large quantities of fine-grained material within Area C is an indication that this is a relatively quiet low-energy area, with at most limited potential under existing conditions for sediments to become mobilized.

With the subsurface PAH contamination effectively contained and little threat of the capping sediments being eroded EPA believes the comparatively minor risk associated with leaving the contamination in place is preferable to the threats of release or other environmental harm potentially involved in sediment removal or comparable actions.

See response to comment 61 in Section X for additional information on ghost shrimp.

14. Comment: The selection of remedy for sediment management units in Area C is based on several assumptions that are not supported by Ecology's experience in accessing and removing contaminated intertidal sediments. Specifically, the selection of enhanced natural recovery (ENR) for areas of surface and subsurface contamination in units 51a does not provide adequate protection of biological resources for several reasons.

Assumption: Enhanced Natural Recovery will not have pronounced impacts while dredging and removal would result in long-term adverse impacts. The placement of a ENR cap will have very nearly the same level of impact to the existing benthic community as complete removal of the sediments. Approximately 95% of the total abundance of organisms comprising a marine benthic community occur in the top one or two centimeters of sediment. These tend to be smaller animals, closely associated with the sediment/water interface and are poorly equipped to be able to burrow up through even a thin layer cap and reestablish themselves at the new

substrate surface. Additionally, to support a mature benthic community, the typically low organic content of a newly placed layer will have to undergo the same period of organic deposition and accumulation that would be necessary for backfilled material following excavation. Hence, the assumption that dredging and removal would have substantially greater impacts than ENR is not correct. (*Ecology*)

15. Comment: Assumption: Dredging and removal will result in existing restoration habitat being adversely impacted for a number of years but ENR would not. Access for land-based equipment does require placement of a temporary solid fill ramp onto the uplands. However, this can be constructed with a narrow footprint and represents the extent of the impacts to existing restoration habitat. (*Ecology*)

Response to Comments 14 and 15: EPA agrees that in the short term, the potential impact in the immediate area of action (i.e., the elimination of benthic species) is likely to be comparable between ENR and removal by dredging. However, the chance of impacts to the surrounding area appears considerably greater in the case of a removal action than with ENR. Dredging is likely to call for the use of heavier construction equipment and more intrusive activity in the tideflat. The recovery time for ENR is also likely shorter than for dredging and backfilling since the thin layer of material placed for ENR will gradually mix with the existing underlying sediment, so organic enrichment should be reestablished more rapidly than with a thick layer of new material.

16. Comment: Assumption: The logistics of dredging would result in significant short-term impacts to the waterway. Dredging sediments in the upper intertidal elevations can be accomplished with minimal short term impacts to the water column and adjacent areas by

- avoiding periods of fish abundance,
- working in the dry using land-based equipment, and
- employing reasonable house-keeping measures to manage contaminated sediments.

Dredging access could be accomplished during low tide, using land-based equipment, by placing steel plates over the sediments directly or over the backfilled material, working out from the shoreline. This results in the least disturbance to the surrounding area, while reducing the footprint of the dredging to the least possible area. Working during low tide and backfilling the excavation prior to inundation eliminates the disturbance and resuspension of contaminated sediments into the water column. Only a small amount of clean fines from the backfill material would be resuspended during the initial inundation. (*Ecology*)

Response: EPA agrees that there are a range of possible methods for managing the impacts and costs of a removal action. However, EPA does not believe dredging is warranted based on conditions in Area C of the waterway. The subsurface contamination appears to have been trapped in fine-grained sediments at the head of the waterway for many years and there is no evidence to suggest that it is a significant source of contamination to the waterway. EPA has determined that based on the data and other factors related to conditions in Middle Waterway, leaving the contaminated subsurface sediments in place with ENR and monitoring is the appropriate remedial action. The risks posed by the subsurface contamination do not warrant

removal at this time.

17. Comment: Boundaries for SMU 51b do not adequately capture exceedances that occur at two locations and chemical and bioassay exceedances in the westernmost portions of this SMU warrant different treatment. The northwest boundary of SMU 51B barely captures the PCB and other exceedances at station MW 008-SP. Station MW 49 has a bioassay hit yet lies at or just outside the northern boundary of SMU 51b. The boundary near MW 008-SP should extend westward to capture the flats extending from the existing bank while abutting the SMU comprising the existing bank here. The northernmost boundary should also extend northward to capture all of the area represented by station MW 49. Station MW 51 exhibited 22 SQO exceedances and 8 of these were greater than 5 times the SQO. The nearest bounding station with a biological pass is station MW 52 which had only 1 SQO exceedance. Station MW 51 appears to represent a hot spot within SW 51b that warrants active remediation.*(Ecology)*

Response: Possible adjustment of the northern and northwestern boundaries of SMU 51b to address results from sampling locations close to the SMU margin will be considered during the development of the design. Modeling of the ENR process for SMU 51b predicted that placement of a 15-centimeter layer of clean material will be sufficient to control the contamination found at location MW51.

18. Comment: Station MW 144 was represented by two replicate samples MWST144RI and MWST144S1 although the results that were presented in the Data Evaluation Report and served as the basis for developing remedial options only considered one of these which happened to have much lower contaminant concentrations. The differences between these stations is represented in the table below. Sample MWST144S1 had a total of 17 SQO exceedances with a maximum exceedance factor (EF) of 6 compared to only 4 exceedances and a maximum EF of 3 for sample MWST144R1. These exceedances were corroborated by the subsurface sample at this station which had 20 SQO exceedances. The nearest station at which bioassays were conducted is TF-22 and which had an AOC-SQS level hit as did station TF-23 (the next nearest station, MW 54 passed bioassays). Both of the nearby stations with bioassay hits had fewer SQO exceedances and lower EFs than at MW 144, indicating the potential for more severe effects at MW 144. Ecology has depicted concentration gradients of two of the PAHs that exceeded SQOs at station MW 144 based on the MWST144S1 results and these are attached. The area represented by station MW 144 warrants active remediation.*(Ecology)*

Comparison of replicate samples from Station MW 144. Sample MWST144R1 was reported in the Data Evaluation Report despite more and higher magnitude exceedances in MWST144S1

Chemical	SQO ug/kg	Sample MMWST144S1		Sample WST144R1	
		ug/kg	EF	ug/kg	EF
Fines		61.14%		61.37%	
TOC		12%		8.90%	
Mercury	0.59	0.8 E	1.36	0.87 E	1.47
Phenol	420	570	1.36	540	1.29
Anthracene	670	1100	1.64	400	0.6
Phenanthrene	1500	1800	1.2	920	0.61
Total LPAH	5200	5910	1.14	2990	0.58
Benzo(a)anthracene	1600	2600	1.63	620	0.39
Benzo(a)pyrene	1600	2300	1.44	690	0.43
Benzo(a)fluoranthene	3600	4800	1.33	1620	0.45
Benzo(g,h,i)perylene	720	2500	3.47	380	0.53
Chrysene	2800	5200	1.86	760	0.27
Dibenzo(a,h)anthracene	230	1400	6.09	130	0.57
Fluoranthene	2500	14000	5.6	1900	0.76
Indeno(1,2,3-cd)pyrene	690	2000	2.9	350	0.51
Pyrene	3300	11000	3.33	1700	0.52
Total HPAH	17000	44400	2.61	8020	0.47
Bis(2-ethylhexyl)phthalate	1300	6500 E	5	4800 E	3.69
N-Nitrosodiphenylamine	28	170 U	6.07	32 U	1.14

EF - Exceedance Factor

Bolded Values Exceed SQO

Response: It would have been more in keeping with common practice to have the DER report the highest measured concentrations or even the average concentrations from the replicate samples collected from location MW144. It would also have been preferable if the existence of these replicate results had been noted more prominently. However, EPA also notes that the results associated with dibenzo(a,h)anthracene shown in the table prepared by Ecology should have been shown qualified as non-detections. In any case the higher results do not markedly alter the overall picture of conditions in Area C presented by the data. In particular the higher findings are still substantially lower than the maximum PAHs measured in subsurface sediments. The results were considered in selecting enhanced natural recovery as the remedy in this area and were included in the summary description of PAH findings in Area C elsewhere in this Responsiveness Summary (see response to comments 10 - 13).

19. Comment: The ESD does a poor job in evaluating alternatives for possible remedial actions and providing documentation of costs associated with the alternatives. Suction dredging through a pipeline extending from SMU 51 (a) to the proposed St Paul CDF would dramatically reduce the handling and transportation costs. (*Puyallup Tribe*)

Response: The ESD is not intended to provide a comparison of remedial alternatives with detail on the level of a feasibility study. EPA acknowledges that there are a number of ways the cost of removing subsurface sediments might be reduced. However, EPA disagrees with the need to take remedial action in Area C, and therefore the fact that there may be cheaper approaches is not relevant. Also note, as discussed elsewhere in this Responsiveness Summary, that projected remedy cost was not the primary basis for selecting the preferred remedy.

20. Comment: In the first sentence EPA believes that the cleanup plan will be protective of human health and the environment and meets ARARs (threshold criteria). The Tribe, based on its review of the ESD, can't arrive at this conclusion. The reliance on natural recovery enhanced natural recovery and leaving subsurface contamination in place within active areas of the waterway leaves the Tribe perplexed on how EPA can assert the cleanup is protective and permanent.

Affirmation of the Statutory Determination The Tribe also disagrees with EPA that the cleanup plan complies with Tribal ARARs. The remedial actions identified in the ESD will continue to jeopardize the health safety and welfare of Tribal members and the natural resources upon which they rely for subsistence and spiritual and cultural use. Furthermore, the last sentence correctly identifies that the proposed remedy will result in "hazardous substances remaining onsite above human-based levels" And that, future reviews will be conducted to ensure that the "remedy continues to provide adequate protection of human health and the environment."

The statement is particularly troublesome for our Tribe whose reservation and way of life has been severely and unjustly compromised for generations. After 20 years of study and tens of millions of dollars, the Tribe demands that the cleanup remedy be permanent and protective. As the indigenous people of Commencement Bay who own valuable properties, the Tribe is vested in the ultimate success of this cleanup. Political reality is there will only be one chance to do it right.

The future recovery of salmon stocks depends on a complete and comprehensive cleanup strategy. The ongoing injuries to juvenile salmonid from exposure to hazardous chemicals will continue under this ESD. The Tribe will not agree to anything less than an protective long term remedy.

In conclusion, the Puyallup Tribe of Indians will continue working with EPA to cleanup the remaining waterways. However, the Tribe does not concur with the ESD. (*Puyallup Tribe*)

Response: EPA identified relevant and appropriate Tribal environmental or facility siting standards, requirements, criteria, or limitations in the Commencement Bay Nearshore/Tideflats Record of Decision (ROD). The proposed cleanup action for Middle Waterway will attain these ARARs to the extent that each is relevant and appropriate to the remedial action. EPA is not aware of relevant and appropriate Tribal environmental or facility siting standards, requirements, criteria or limitations that have been promulgated since the ROD was issued.

EPA believes that the actions proposed for Middle Waterway, including leaving the subsurface

contamination in place at the head of the waterway with ENR and monitoring are protective of both human health and the environment in the long-term. EPA disagrees with the assertion that exposure to hazardous chemicals will continue under this ESD. As previously stated (see responses to Comment 9), Middle Waterway will be significantly improved by the proposed overall remediation of the entire waterway. The long-term monitoring program will be designed to ensure that any changes in conditions of the subsurface contamination at the head of the waterway will result in additional remediation if necessary. Juvenile salmon will spend at most only limited time at the head of the waterway because this area is only inundated at high tides. Concentrations of contaminants in surface sediments are expected to decrease through ENR and EPA believes any contact salmon might have with contaminants will be very limited and certainly decrease over time. There is also other suitable juvenile salmon habitat currently available in Middle Waterway which will be improved as a result of the remedial action. Once the St. Paul mitigation project is completed, it will provide additional suitable habitat for juvenile salmon. (Similar response used with Comment 55).

21. Comment: NOAA concurs with the finding of the ESD and is willing to support the cleanup actions specified. However, there is some concern regarding the cleanup proposed at the head of the waterway (Area C). The ESD states that the cleanup for Area C will consist of no action for Sediment Management Units (SMUs) 52a and 52b and for enhanced natural recovery for SMUs 51b and 51a, leaving considerable subsurface contamination in place under 51a. In general, NOAA does not support leaving a large source of highly contaminated material in place due to the potential for release and recontamination of surface sediments. In particular, the head of Middle waterway is the site of several restoration projects that could be at risk, should the subsurface material be exposed. These concerns are mostly addressed by the ESD (see comments 3 and 4 below). With the understanding laid out by the ESD, that the PRPs will provide close monitoring of this area and agree to further action should the contaminated material become exposed, NOAA will support the cleanup specified. NOAA is very interested in continuing to work with the EPA with monitoring issues and we look forward to reviewing the monitoring plan for Middle Waterway. (NOAA)

Response: The monitoring program will be designed to detect possible impacts to the restoration areas at the head of the waterway. EPA will continue to work with NOAA to ensure that monitoring requirements are satisfactory and address NOAA's concerns.

22. Comment: CHB understand that both the City and MWAC are resistant to removal of these contaminated sediments due to the difficulty of accessing them, the cost of sediment remediation and possible impacts to the City's restoration site. The City of Tacoma willingly assumed the risk to its restoration site when it undertook construction of the site in advance of remedial action in Middle Waterway and by not including it in their initial construction plan. Furthermore, as evidenced by the attached letters, the Commencement Bay community expects EPA to mandate removal of the subsurface PAH contamination, as it would have if the City site had not been constructed. (CHB)

23. Comment: Waterway Area C - The remedy selected for the head of Middle Waterway is incompatible with the status of the site as a NRDA habitat restoration area and aquatic reserve

area designated by the Department of Natural Resources. Physical removal of PAH contaminated sediments is necessary in order to protect the long-term integrity of the entire habitat unit. Furthermore, EPA's rationale for avoiding disturbance to the City's year old NRDA restoration site fails to acknowledge that immediate removal of contaminated sediments will create far less impact now than would any future sediment removal made necessary by failure of the proposed remedy or possible expanded, landscape-scale watershed and estuarine habitat restoration projects. (CHB)

24. Comment: CHB appreciates EPA's reluctance to impact the NRDA habitat site constructed last year by the City of Tacoma, but reminds EPA that the City undertook site construction with full awareness that the subsurface PAH contamination was present and that, ultimately, removal of the sediments contaminated by the PAHs was regarded as necessary. In May 1999, CHB provided comments to the City of Tacoma and Washington State Department of Ecology regarding the proposed construction of the NRDA habitat restoration site urging them to coordinate the construction and upland remedial action with the overall sediment remediation of Middle Waterway under Superfund. During this same public comment period, MWAC also provided comments to the City and Ecology expressing their concerns regarding the proximity of the habitat site to the PAH contamination. Clearly, had EPA and Ecology exercised a reasonable degree of coordination when construction of the City's NRDA restoration site was being considered, removal of the PAH contamination adjacent to the site would have been performed in conjunction with the upland removal and habitat construction effort. (CHB)

25. Comment: Active sediment remediation must be conducted throughout this unit to remove subsurface PAH contamination and surface metals located in the sediments at the head of Middle Waterway. The ESD cites the need to protect the City of Tacoma's NRDA habitat restoration site but fails to acknowledge that the City, Ecology and EPA were aware of the need to remove contaminated sediments adjacent to the site prior to site construction. (CHB)

26. Comment: Active remediation, either physical removal or in-situ treatment technology, provides the only permanent and protective remedy at the head of Middle Waterway. Furthermore, it is almost certain that EPA would have selected active remediation at the head of the waterway if the City's NRDA restoration site were not present, and the NRDA Trustees themselves were adamant subsurface PAH contamination be removed from the habitat and aquatic reserve area. It would seem that, as the City pursued construction of the habitat site without removing the adjacent contamination, they assumed the liability that the site would be impacted when excavation of the contaminated sediments was ordered under the Middle Waterway Superfund cleanup action. Site disturbance now, when the NRDA restoration site is just a year old, will create far less impact than would any future sediment removal made necessary by failure of the proposed remedy or possible expanded, landscape-scale watershed and estuarine habitat restoration projects. (CHB)

Response to Comments 22 through 26: With hindsight it may be tempting to argue that the City's restoration project and cleanup of the contaminated sediments in Middle Waterway should have been more closely coordinated. However, efforts have been made to coordinate the investigation of contamination and releases of hazardous substances in Middle Waterway

including the upland areas. At the time the restoration project was begun, EPA's remedial investigation under Superfund had not been completed and there were insufficient data to support a remedial action decision. The restoration project was implemented pursuant to different statutory authorities over which EPA has no jurisdiction. Whether EPA's cleanup decision would have been different had the restoration project not occurred is pure conjecture, especially given the ultimate findings of the investigation. The presence of the restoration area in close proximity to the subsurface contamination is only one factor in EPA's decision to leave the contamination in place, and certainly not the main reason for this decision. EPA has evaluated removal of these sediments against the nine criteria as required by CERCLA and in balancing these criteria, EPA has determined that leaving the subsurface contamination in place is protective of human health and the environment.

EPA appreciates the interest shown by the community in the cleanup as evidenced by the more than 65 letters received during the public comment period. However, again in accordance with the Superfund nine-criteria evaluation, the decision is based on the technical merits of the facts as well as on public concern. The subsurface contamination at the head of the waterway represents a small portion of the site. Active remediation will be conducted throughout Middle Waterway, including dredging and disposal of over 90,000 cubic yards of contaminated sediments at the mouth of the waterway, along with thick capping. When the full range of planned cleanup actions for Middle Waterway is considered, the selected remedy represents a significant overall improvement to the waterway and is protective of human health and the environment.

27. Comment: Other factors not addressed by the ESD that make it necessary for EPA to amend the proposed remedy at the head of Middle Waterway are:

The top of the subsurface PAH contamination is shallow, 1-2 feet below the sediment surface. Large debris, mostly logs and tires, regularly floats into the waterway during high tide cycles, is deposited as the tide recedes and readily sinks into the soft sediments. When removal of this debris is required in order to maintain properly functioning conditions, very likely the shallow subsurface contamination will be exposed. Imposing institutional controls restricting removal of grounded debris from this area is not an acceptable alternative, given the need to manage and maintain the critical habitat provided by both NRDA restoration sites that border the head of the waterway. (CHB)

Response: Large items such as logs or tires, that could be a hazard to navigation are generally removed by FOSS and Marine Northwest Industries as part of their standard operating procedures to avoid vessel damage and interference with shipping operations (personal communication from MWAC). The Corps of Engineers also operates a ship, the Puget, whose mission is to remove large items from the waterways to prevent navigational hazards. While it is always possible that items such as logs or tires could reach the head of the waterway, EPA expects such occurrences to be relatively infrequent and perceives that the risk of exposure of subsurface contamination is quite low.

28. Comment: Historically the channel from Outfall 200 at the head of the waterway has been stable; a significant portion of the area served by this outfall is permeable surface that does not

drain to the outfall, thus limiting the demands historically placed upon it. Development will certainly take place within the drainage basin, and result in an unprecedented discharge volume from Outfall 200 as a result. The increased flows, especially during a large storm event can cause scour at the head of the waterway that would expose the contaminants. (CHB)

Response: Historically, scouring has not been a problem associated with stormwater flow from Outfall 200. Outfall 200 serves the area bordered by Portland Avenue, East 11th Street, and St. Paul Avenue. EPA checked with the City of Tacoma to determine if there are future development plans that may cause an increase in the volume of stormwater through Outfall 200. Within this area, the only known or planned development is the construction of a warehousing facility by USF Reddaway. Based on the City's response, there won't be much, if any, impact from this project to Outfall 200. All development/redevelopment in the City is subject to Volume 1 of the City's Stormwater Management Plan for Construction. The Municipal Code requires retention/detention ponds for larger facilities as a way of managing flow from the municipal outfalls so that stormwater flow does not ultimately become a problem for the receiving environment. The City's manual is based on state and federal guidance for stormwater management and treatment, and the City has been successful in enforcing the code for new development both to maintain water quality and regulate flow rates.

In the event of future development that may occur within the boundaries of the area served by Outfall 200, EPA will be alert to the need to reassess whether there will be significant impacts from stormwater that may affect the head of Middle Waterway. As part of the long term monitoring plan for Middle Waterway, EPA, in conjunction with the City and other appropriate agencies, will assess if there may be the need for reconsideration of the remedy for SMU 51a depending on the anticipated volumes.

29. Comment: Increased stormwater flows as described above may also erode clean sediments placed as part of an enhanced natural recovery strategy, and re-expose surface contamination. Sedimentation at the head of Middle Waterway is light and CHB anticipates that, without the presence of the clean material, natural recovery would not occur. (CHB)

Response: EPA agrees that it is possible that increased stormwater flows could erode clean sediments placed as part of an enhanced natural recovery strategy. However, based on the information provided above, there is currently no reason to believe that there will be a large increase in the volume of stormwater discharged at Outfall 200. Modeling projections indicate that enhanced natural recovery (ENR) will be effective at the head of the waterway. Nonetheless, the clean material used for ENR will be tracked and monitored to determine the success of enhanced natural recovery in achieving the SQOs. If there are increased flow volumes from Outfall 200, this information will be considered in monitoring the performance of ENR.

30. Comment: The City NRDA site is subject to adaptive management practices, some of which may mean that subsurface contamination could be exposed at some point in the future. This is not an unrealistic or unprecedented expectation. As a result of poor performance, material at the Simpson NRDA habitat restoration site was excavated and a partial reconstruction of the site was undertaken several years ago. Leaving the subsurface contamination in place potentially restricts

the range of available decisions the Commencement Bay NRDA Trustees can make on future adaptive management strategies at the City site. (CHB)

Response: Leaving the subsurface contamination in place at the head of Middle Waterway will not impede implementation of adaptive management strategies that may be necessary to ensure the viability of the NRDA restoration sites in Middle Waterway. Long-term monitoring will help identify areas that need further evaluation and/or additional remedial action.

31. Comment: The contamination is located on State-managed, publicly held aquatic lands. This fact alone dictates that active remediation of contaminated sediments must be undertaken. EPA is aware of the public will that public aquatic lands are not appropriate for sediment disposal or passive remedial strategies. (CHB)

Response: The mere presence of contamination on State owned lands in and of itself does not mean the contamination must be removed. No ARARS have been identified by the State of Washington or other stakeholders that would lead EPA to conclude that removal of the subsurface contamination is mandated by existing law.

32. Comment: The proposed remedy limits the scope and potential for future possible restoration activities. The Simpson and City's NRDA habitat restoration areas buffer the aquatic lands and, with the construction of the Olympic View and St. Paul facility habitat mitigation sites, are an integral segment of contiguous critical nearshore habitat extending from the mouth of the Puyallup River. As such, this site is the focus for possible future expanded watershed restoration and landscape scale estuarine restoration projects. Although a project of this scale is not required mitigation for any Superfund-driven activity, other agencies and groups continue to express reliance on the head of Middle Waterway as a logical core site for expanded landscape and ecosystem restoration projects, such as expanded inland marsh and wetland projects, which could be connected via the existing stormwater system to the waterway, and any future project to create a fresh water channel from the Puyallup River. EPA's proposed remedy would severely limit the potential of this important habitat corridor for the future. (CHB)

Response: The ESD explicitly states that the subsurface contamination at the head of Middle Waterway should not be treated as an obstacle to future restoration or mitigation projects in the waterway. If such a project is under serious consideration and there is a basis to move forward, that will likely be adequate justification for removal of the subsurface contamination. EPA has no intention of allowing the subsurface contamination to interfere with valid restoration/mitigation projects in Middle Waterway, and the presence of this known contamination will not be a barrier to future restoration work.

33. Comment: CHB recognizes that the ESD does provide an avenue for more aggressive sediment remedial action if the proposed remedy fails or a change in site circumstances warrants physical removal of contaminated sediments left in place. In such an instance, the adverse impact to the City of Tacoma's NRDA restoration site would be greater than if sediment excavation had initially been undertaken as the site would have had a number of years to develop and mature toward achieving a properly functioning condition. Better that the site be disturbed by remedial

actions carried out now than later. (CHB)

Response: EPA agrees that theoretically there would be less of an adverse impact on the NRDA restoration site if the subsurface contamination were to be dredged now rather than later when the site is more mature. However, as EPA has previously stated above, leaving the subsurface contamination in place with ENR and monitoring is protective of human health and the environment and there is no need for dredging given the minimal exposure risk associated with the subsurface contamination in SMU 51a.

IV. Design Issues

34. Comment: SMU 2 and 3a. The maximum depth of excavation appears to be about 9 feet below mudline and contamination still had not been bounded by the deepest core segment at Station MW 105 (6.5 to 8.5 feet). This requires design-phase sampling or focused, post-dredge sampling to confirm that contamination was removed and clean material exposed. (*Ecology*)

35. Comment: SMUs 9a and 22. The eastern boundaries for these SMUs should be moved shoreward (east) to better capture contamination at station MW 027 (SMU 9A) and MW 030 (SMU 22) where subsurface contamination is high. As currently drawn, the eastern boundaries bisect stations MW 027 and MW 030, and a dredge cut here would leave high contamination levels exposed. The lateral extent of subsurface contamination needs to be better characterized to allow final dredge cut location, or extensive post-dredge performance monitoring would have to be conducted to confirm that the contamination was removed. (*Ecology*)

36. Comment: SMU 29. Station MW 113 did not appear to have encountered clean sediments at 7.7 feet below mudline. The proposed dredge depth of about 10 feet at station MW 113 may reach clean material but design-phase sampling or post-dredge confirmational sampling must be performed to ensure that the contamination is removed and clean sediments are exposed. (*Ecology*)

37. Comment: SMU 40. Station MW 137 did not appear to have encountered clean sediments at the maximum depth of 5.4 feet below mudline. The proposed depth for dredging at this SMU is about 7 feet below mudline which may reach clean, native material. However, additional design-phase sampling or focused, post-dredge, confirmational sampling must be performed to ensure that the contamination is removed and clean sediments are exposed. (*Ecology*)

38. Comment: SMU 49. This SMU should be extended northward to capture Station MW 24 which has several surface and subsurface SQO exceedances and the SMU designated for active remediation. The adjacent SMU, 9a and 9b, were designated for dredging based on the exceedances at station MW 27 and SMU 8 was designated for Natural Recovery based on exceedances at MW 26. This footprint of contamination was not bounded by clean sediments at station MW 24 and the boundary for active remediation should include SMU 49 and be addressed by additional design-phase sampling or focused, post-dredge, confirmational sampling to ensure that the contamination is removed and clean sediments are exposed. (*Ecology*)

39. Comment: Area B - SMU 53. Numerous stations with SQO exceedances are barely captured by the proposed boundaries of this SMU (e.g., Station MW 131 had exceedances for lead at 18 times the SQO, yet the boundary is within several feet of this station). These boundaries must be protective of the environment, extending out from known contaminated stations except where clean stations are shown to bound the existing gradient of contamination. (*Ecology*)

40. Comment: Performance criteria for natural recovery areas must be developed that are proactive and provide early warning that the prescribed remedy is insufficient to insure that sediments meet SQO at year 10 and that additional remedial action is necessary.

Institutional controls are not substitute for performance. While they may be necessary on the short-term, institutional controls are not a permanent remedy to the problem. (*CHB*)

Response to Comments 34 through 40: These comments focus on details of the proposed remedy. For example, several comments suggest the need to adjust selected SMU boundaries based on sediment chemistry results. Details of this sort have not been settled definitively and are appropriately addressed during the design process. Design details such as these will be subject to review and discussion as the design evolves.

41. Comment: Section V. A. Area A, pg. 7. In the text, problem sediments in SMU 15a will be dredged, but Figure 2, shows this area as no action. Please correct Figure 2. (*NOAA*)

42. Comment: SMU 15. This SMU is characterized by core data from station MW 151 which has a mercury EF of 3.22 in the upper interval. This corresponds to mercury reported at nearby surface stations MW 027 and MW 030 where mercury EFs were 1.51 and 3.39, respectively. Subsurface EFs at stations bounding SMU 15, (i.e., at stations MW 027, MW 030 and MW 152) were 10.7, 22.22 and 14.31. Given these adjacent exceedances, the No Action decision for SQO 15 is not warranted, particularly in light of its designated use as salmon habitat. As currently proposed, the delineation of SMU 15 does not provide adequate protection of the aquatic biota and uncertainty regarding the horizontal and vertical extent of contamination is borne entirely as risk to the resources. At a minimum the boundaries denoted by stations MW 027, MW 030 and MW 152 should be moved towards station MW 151 to better capture the contaminated sediments associated with those stations and to avoid a dredge cut that leaves contamination exposed. Also, SMU 15 is not addressed in Section This SMU is also n [*sic*] (*Ecology*)

43. Comment: SMU 20. This SMU should be designated for remedial dredging based on the nearest stations MW 111 and MW 031 which exhibited many high EFs in surface and deeper subsurface sediments. Station MW 031 appeared to be very close to the eastern boundary of SMU 20 and had SQO exceedances that continued to 7.6 feet below the mudline. (*Ecology*)

SMU	EF of Surface Sediments	EF of Subsurface Sediments
		Station #Exceedances/Highest EF
20	*MW 111	*MW 111 16/32.00
	13 PAHs 5EFs >2 and <3	*MW 031 15/15.25
	*MW 031	
	12 PAHs 3EFs >2 and <3	
	Mercury 1.56	
	PCB 4.33	
	4,4-DDE 10.33	

* Nearest Adjacent Sample

Response to Comments 41 through 43: While these SMUs are not designated for comprehensive dredging, the sideslopes of these SMUs, the areas most closely associated with the SQO exceedances, will be removed in connection with dredging in adjacent SMUs. This is documented in footnote 3 to Figure 2 in the ESD.

44. Comment: Section V.C on page 10, paragraph 3 incorrectly states that "...the freshwater delivery system will not be located at the head of Middle Waterway as originally thought." Although a channel traversing the Tacoma tideflat uplands from the Puyallup River to Middle Waterway is not planned, the design of the freshwater source is still in the study process. It is our understanding that EPA has not made a decision on the quantity, timing, and location of a piped freshwater source until these studies are completed. (*Simpson*)

Response: EPA acknowledges that the final design of the freshwater sources that is integral to the St. Paul habitat mitigation project planned for Middle Waterway has not been approved. However, in November 2001, the City of Tacoma submitted the Draft Final Design for remedial action for Thea Foss and Wheeler-Osgood Waterways. That design shows the freshwater delivery system will be installed along the eastern shoreline of Middle Waterway and indicates the discharge will be "via diffuser." At this time, EPA has no reason to believe that there will be a single discharge point at the head of the waterway. If there is a significant deviation from this current design plan, EPA will reevaluate the selected remedy for SMU 51a.

45. Comment: Assumption: The proposed isolation of the dredge activities requires a cofferdam. By accessing the dredge area during low tide, using land-based equipment, the construction of a cofferdam can be avoided. This substantially reduces the cost and logistics required to access and remove the contaminated intertidal sediments. Furthermore, the work can be accomplished while avoiding impacts to the surrounding restoration sites except for the placement of a temporary solid fill ramp at the point of shoreline access. The relatively small volume requiring excavation (3850 cys to 9300 cys, for Alternatives C-2 and C-3 respectively) and the minimal entrainment of water lends itself to upland handling and transport to offsite disposal such as the Roosevelt Landfill. Cost estimates range from \$809,000 to about \$1,400,000 for Alternatives C-2 and C-3 (the latter without a cofferdam). (*Ecology*)

46. Comment: The costs associated with the dredging versus "enhanced natural recovery" are not explained well in the document. For example, the 92,700 CY volume estimate of Table 1 is not found in any cost estimate tables of the appendices. Nonetheless, the cost of dredging

contaminants from SMU 51a could be considerably reduced by basing the operation on land and eliminating the use of coffer dams. Although EPA's concern over possible damage to restoration projects from a land-based operation is commendable, since these projects are not yet well established, a short-term disruption (which might not occur in any event) may be acceptable to the Trustees if it would result in a greater long-term benefit to the environment. (*Ecology*)

47. Comment: CHB reminds EPA that in-situ bio-remediation of PAHs has been successfully completed numerous times and our initial research indicates that some work has been done in the aquatic environment and with sediments, primarily in EPA Region 2. The footprint of the subsurface PAH contamination in Middle Waterway makes it an excellent candidate for field-testing methods that have proved promising in bench-scale testing. As an alternative to excavation of the contaminated sediments, EPA might consider relying on an in-situ treatment technology as a means of active remediation. (*CHB*)

Response to Comments 45 through 47: The comments address alternatives that may have the potential to reduce costs or simplify the logistics associated with removal of the subsurface contaminated sediments in Area C. The comments suggest ways to avoid construction costs of a cofferdam, use alternatives to dredging, and support the idea that the work can be accomplished without seriously damaging the surrounding restoration sites.

EPA agrees that there are a number of ways to accomplish removal of the contaminated subsurface sediments and does not dispute the fact that there are options that might lower the cost of dredge activities. EPA also acknowledges that there may be other technologies such as in-situ treatment which may be a viable alternative to dredging. However, EPA fundamentally disagrees with the need to take remedial action at this time in this particular area of the waterway and therefore, the fact that there are cheaper alternatives or other technologies is not relevant. While the cost of dredging vs. leaving the contaminated material in place is a factor in EPA's evaluation process (based on Superfund's nine criteria), EPA's decision to leave the contaminated subsurface sediment in place is based on the belief that this contaminated material is not a risk to human health or the environment and removal or treatment is not necessary. The contaminated subsurface is not acting as a significant source to the waterway nor is it impacting its surroundings. If dredging this material is deemed to be necessary in the future due to a change in existing conditions, EPA would certainly strive to limit the costs of removal and minimize the impacts to the surrounding restoration areas.

EPA does not agree that the volume estimates for the costs of dredging are inconsistent. The volume reported in Table 1 of the ESD is an estimate of 92,700 cubic yards of total sediments to be dredged. In Table 2 of the Appendices, the volume used for estimating the cost of Alternative A-2 is 91,500 cubic yards. The volume used for estimating the cost of Alternative B-1 is 1,200 cubic yards, which totals to 92,700 cubic yards as reported in Table 1. These numbers are presented as working estimates; the values may go up or down depending on actual field conditions.

Regarding the advantage of a short-term disruption to the restoration projects vs. long-term benefit, please refer to EPA's response to comment 8, Section III.

V. Role of ESD

48. Comment: The proposed remedial action for Middle Waterway is in conflict with both the Commencement Bay Nearshore/Tideflats Biological Assessment (CB N/T BA) and the Commencement Bay 404 (CB 404). There does not appear to be any discussion of how the EPA will require compensatory mitigation for any of the unavoidable adverse impacts to the aquatic environment (CBN/T BA, p. 3-2; p. 14-2; CB 404, p. 18). Nor is there any discussion of how the EPA's required freshwater source for Middle Waterway will be impacted by the Middle Waterway Draft Explanation of Significant Differences (MW DESD) remedial actions (CB 404, p. 19). The MW DESD does not consider the impacts of the remedial action on the habitat restoration activities described in the City of Tacoma, Simpson Tacoma Land Company and U.S. EPA "Habitat Plan and Design Report St. Paul Waterway Nearshore Facility" dated April 2000, and relied on by the EPA (CB 404, p. 3). Additionally, the discussion of performance criteria for remedial actions does not appear to be responsive to the performance criteria the EPA has identified for Commencement Bay (CBN/T BA, p.14-1; CB 404, p. 22). (DNR)

Response: EPA has prepared the following to clarify the intent of providing an Explanation of Significant Differences for public review. If any aspects of a remedial plan differ significantly from an existing Record of Decision (ROD), EPA is required to publish an Explanation of Significant Differences (ESD) prior to the adoption of the final remedial plan. The ESD should explain why EPA proposes to make changes. It is not intended to be a complete report of all aspects of the remedial activities. In this case, EPA prepared the Draft ESD for Middle Waterway to provide information on the significant differences from the 1989 ROD. This ESD should not be considered a source of detailed information on all remedial activities by EPA in Middle Waterway. As stated in the Draft Middle Waterway ESD, EPA's July 1997 and August 2000 ESDs (both for Commencement Bay Nearshore/Tideflats Superfund Site) are also applicable to Middle Waterway. These documents summarize EPA's finding and performance criteria, in conjunction with its overall cleanup and recovery goals for Commencement Bay. Since EPA's intent for habitat restoration goals have been consistent since presented in the 1989 ROD and further clarified in the August 2000 ESD, EPA determined it was not necessary to include specific detail in the Draft ESD for Middle Waterway. However, EPA did summarize selected habitat information in Section E.

To respond to some of DNR's specific concerns, the remedial activities in Middle Waterway are consistent with EPA's overall restoration goals for Commencement Bay as outlined in the August 2000 ESD. As stated in Section E, EPA expects a small net conversion of 0.29 acres of aquatic habitat from intertidal to shallow subtidal. This is a small area in front of the existing scow shed that forms a berm which traps water inside the scow shed at low tide, often trapping fish and creating poor water quality conditions. EPA could have required replacement of the intertidal habitat formed by the berm, however, in this specific instance, EPA believes greater habitat benefit is derived by leaving the entire shallow subtidal area open to free exchange of water. Therefore, EPA will not require additional compensatory mitigation for project construction. EPA has also coordinated the compensatory mitigation activities for Thea Foss/Wheeler-Osgood Waterway remedial actions and the NRDA restoration projects in Middle Waterway with the proposed remedial actions. EPA has concluded that the remedial action will

not result in any undue restriction of compensatory mitigation actions or future restoration actions, including the proposed freshwater source for Middle Waterway. EPA has also concluded that the remedial actions incorporate elements that are consistent with EPA's restoration goals for Commencement Bay. Design plans will include habitat enhancement features and the avoidance of unnecessary impacts to the aquatic environment. Additional background information can be found in the Administrative Record.

VI. Disposal Options and Elements

49. Comment: The MW DESD does not provide the factual basis necessary to reach a reasoned conclusion whether it is in the best interest of the citizens of the State of Washington to have Middle Waterway contamination remain in-place. As presently written, the MW DESD proposed remedy would shift the cost and responsibility for Middle Waterway clean up to other salmon recovery activities. The cleanup remedy must leave these priority lands unencumbered. The institutional constraints imposed by the remedy will make restoration a substantial obstacle for any agency or group. The MW DESD explicitly states that future restoration is not prevented by subsurface contamination in upper Middle Waterway (Area C). How will specific monitoring and adaptive management contingencies be developed to assure that the remedy does not constrain restoration projects, including delivery and utilization of freshwater inputs to create and maintain estuarine habitats that alter water and sediments circulation patterns?

Referring to treatment, upland disposal, and the various aquatic disposal options, how did EPA consider whether the remedial action costs of the proposed encumbrance are appropriate or beneficial to the citizens of the state? DNR reiterates its comments regarding disposal submitted for the draft CBN/T ESD; treatment could result in a unit cost below the \$40/cy listed in Table 2 for aquatic disposal. Upland disposal may also be less expensive. This is supported by Multi-user Disposal Siting (MUDS) studies. Without removal, the risk of failure will always be present. Pathways for recontamination, such as ruptures and bioturbation, could develop over time in the overlying sediment and the enhancement layer. EPA should consider the ongoing costs such as monitoring and implementing institutional controls in computing remedial action costs. If treatment does not prove to be viable, then DNR prefers upland disposal as a second choice to aquatic disposal.(DNR)

Response: Information collected during the Middle Waterway pre-remedial design investigations and available in the Administrative Record suggests that the subsurface contamination in Area C is not acting as a significant source of contamination to Middle Waterway. The most contaminated subsurface material begins approximately one and a half to two feet below the surface and extends to a depth of approximately five feet. Although there are exceedances of the SQOs in surface sediments, the shallow sediments to a depth of one and a half to two feet have considerably lower chemical levels than the deeper sediments. There appears to be little correlation between the surface sediment exceedances and the location of the highest levels of subsurface contamination. Therefore, it is not possible to attribute the surface contamination levels to the subsurface PAHs.

EPA disagrees with the assertion that the proposed remedial action would shift cost and

responsibility for Middle Waterway cleanup to other salmon recovery activities. The most significant contamination likely to impact fish and other organisms in Middle Waterway is found in Area A at the mouth of the waterway. Cleanup of Area A under CERCLA will result in the removal of approximately 93,000 cubic yards of contaminated sediments, and thick layer capping will further reduce exposures to contaminated sediments. Thin layer capping of the surface sediments at the head of the waterway is expected to meet the SQOs within 10 years. Since there is no evidence that the subsurface contamination at the head of the waterway is significantly impacting the waterway, EPA believes that leaving the subsurface contamination in place is protective of the environment. Overall the environmental conditions in Middle Waterway will be greatly enhanced by the entire range of actions planned for the waterway. Monitoring and adaptive management contingencies will be developed as part of the Remedial Design and will not present an obstacle to restoration. The long term monitoring plan for Middle Waterway will contain specific monitoring requirements and methods to determine chemical contamination levels, define the extent of any erosion, and detect any contaminant movement. The plan will also identify specific threshold values which, if exceeded, may trigger reevaluation of the need for additional cleanup at the head of the waterway.

Complete removal of contamination is not a requirement in the Superfund program. EPA uses the nine criteria outlined in CERCLA as the basis for cleanup decisions. While cost is an important factor in the selection of any cleanup remedy, it is not the primary reason for not choosing to remove the subsurface contamination at the head of the waterway. Since the data indicate that the subsurface contamination is not acting as a significant source of contamination in the waterway and there are no apparent exposure pathways of concern to human health or the environment from the subsurface contamination in Area C, there is no need to dredge at this time. Remedy costs will be refined during the design phase of the project. Costs of long-term monitoring and institutional controls are factored into the estimated remedy costs. The monitoring program will be designed to ensure detection of bioturbation problems or any other exposure pathways that may cause remedy failure.

VII. Habitat Value

50. Comment: In Area A, both SMU 5a and 5b lie within an area that Charles A. Simenstad has identified as delta and foreshore environment (Commencement Bay Aquatic Ecosystem Assessment, 2000) Eelgrass beds have been documented to cover a portion of the clean up area. The EPA has not provided information as to the habitat in this area, the resources at-risk, or the impacts resulting from the remedial action. The EPA admits that not enough samples have been taken in SMU 5b to define the levels of contamination (MW DESD, p.8). If there are unavoidable impacts, then why are they not identified in the MW DESD?(DNR)

Response: Based on discussions with DNR staff on November 28, 2001, it is EPA's understanding that this comment is referring to the presence of eelgrass beds in the vicinity of SMU5b. The presence of the eelgrass beds has been noted in the final ESD. EPA does not believe that there will be adverse impacts to the eelgrass beds as a result of any of the actions planned for SMU 5a or 5b. (Also, see response to Comments 1 and 2 regarding SMU5a.)

51. Comment: For Area B, DNR believes that the EPA needs to rethink the proposed remedial actions presented in the MW DESD. For example, EPA notes that SMU 55 is a part of the habitat mitigation for the St. Paul Waterway nearshore disposal facility. EPA states that, for the contamination in SMU 55:

"When that mitigation project is constructed, as part of that construction effort, contaminated sediments will be dredged and disposed of at a suitable site. If the habitat mitigation area is not constructed, EPA will require a combination of enhanced natural recovery in the northern portion of the SMU (to address exceedences at MW156, MW158, and MW039)."

With these words, EPA appears to be transferring remediation costs for this area of Middle Waterway to the Thea Foss potentially responsible parties (PRPs). DNR does not view it as appropriate to burden or constrain the broader salmon mitigation efforts with costs that are clearly a clean up responsibility. How does EPA validate transferring remediation costs for Middle Waterway PRP's to the Thea Foss PRP's?(DNR)

Response: The wording in the ESD regarding the selected remedy for SMU55 will be revised. See response to Comments 6 and 7.

52. Comment: The discussion on cost-effectiveness of containment verses removal on page 11 is only a partial documentation of the values of contributions to the remedy alternatives. DNR believes the cost of achieving a greater level of protectiveness is justified by the high value of intertidal lands as existing habitats for improved baywide function through future restoration work. EPA has recognized those values for Commencement Bay (CB 404, p. 23). Facilitated by EPA, the Simpson plan was incorporated as part of the EPA's 404 analysis for Commencement Bay.

The cleanup remedy must leave these priority lands unencumbered and available for further restoration. The discussion on cost-effectiveness of containment versus removal on page 11 is only a partial documentation of the values of contributions to the remedy alternatives. How have the encumbrances been considered in determining the appropriate and beneficial costs to the citizens of the state as well as the (other) PRPs? It will be extremely difficult for the DNR to justify authorization of activities that will result in the parties performing the clean-up realizing a cost-savings benefit at the expense of the citizens of the state.(DNR)

Response: EPA recognizes the high value of intertidal lands. However, based on EPA's analysis of the data, the residual risk posed by the subsurface contamination at the head of the waterway does not justify removal under Superfund. Based on the November 28, 2001 discussion with DNR representatives, EPA understands that DNR believes that the actions will result in undue restriction or burden on citizens of the State. EPA does not concur with this statement for the following reasons: (1) Approximately 93,000 cubic yards of contaminated sediments will be dredged out of Middle Waterway along with other actions such as thick and thin layer capping; and (2) Sources of contamination into the waterway have been controlled. Accordingly, the proposed cleanup remedies will leave Middle Waterway significantly less "encumbered" than the current condition. EPA also believes that future habitat restoration

activities can be accommodated within Middle Waterway under the proposed cleanup and monitoring activities without undue restriction. Under CERCLA, EPA is required to evaluate cleanup alternatives using the nine criteria established in the NCP. The proposed remedy for the subsurface contamination at the head of Middle Waterway represents the best balance of tradeoffs when compared to other options.

53. Comment: On page 10-11 EPA noted the existence of several habitat restoration projects that surround SMU 51 a, an area selected for natural recovery and one of the few remaining relatively natural mudflat habitat areas within Commencement Bay. These habitat restoration projects have been proposed and constructed to provide unique and important habitat needs for federally listed fish and other aquatic biota. It is unclear how the constructed restoration areas would be "severely damaged" by the construction of a cofferdam built to remove the subsurface contaminated sediment. SMU 51 a appears to be accessible directly from the south and southwest sides and is situated far enough away from the estuarine and shore restoration sites to prevent direct effects from a dredge operation. Alternatively, accommodations could be made with the abutting landowners to access the site. If the contamination was removed in SMU 51 a, the threat of future contamination of the restoration sites would be resolved - an ongoing threat as long as the contaminants remain in-place. DNR believes that the Commencement Bay NRDA Trustee's felt removal of contaminated sediments and the short-term affects of a cofferdam were acceptable, considering the long-term benefits. Why did the EPA feel the short-term effects were too great when deciding to leave the contamination in-place?(DNR)

Response: EPA believes that dredging is technically possible, albeit difficult and that there would be adverse short-term impacts to the restoration areas at the head of the waterway due to construction activities. However, EPA has determined that dredging is not warranted at this time. (See responses to other previous comments).

54. Comment: On page 9 of the MW DESD, EPA stated the proposed remedy of natural recovery would be monitored for "colonization by marine species capable of transporting subsurface contamination to the surface." Some of the aquatic biota to be protected by Middle Waterway restoration likely includes species capable of bioturbation. At the Asarco Site (OU6), EPA decided that based on the depth of burrowing organisms known to be present at the Asarco facility, the proposed cap was not thick enough. As a result, EPA supported the placement of a 3-foot cap at the site. The leading cause of the bioturbation was due to the presence of *Neotrypaea californiensis* (ghost shrimp). Because bioturbation extended to depths of approximately 30" + the depth of the cap was increased because:

"...EPA believes a 3 foot cap is necessary to protect human health and the environment and to ensure long-term effectiveness and permanence, but still be cost-effective. The EPA's preferred alternative is not arbitrary and capricious and beyond the scope of EPA's authority, " as stated in the above comment. For the reasons described below, EPA does not believe that the 0.6-meter (2 foot) cap proposed by Asarco is protective of the environment or effective long term..." (Asarco Sediment/Groundwater Operable Unit 06 Record of Decision, Part III, pg. 9, 10).

At Middle Waterway, *Neotrypaea californiensis* (ghost shrimp) are present as well as *Upogebia* spp. (mud shrimp). Since the Middle Waterway environment is a dynamic system with potential

external disturbances (tides, storms, erosion, boating, etc.), would bioturbation within the contaminated sediments contaminate the proposed cap or prevent natural recovery over time? Why is the threat of bioturbation recognized at Asarco not applicable to Middle Waterway-a location where ecological function of the sediments is much more critical to baywide ecological health?(DNR)

Response: The selected remedy for addressing the surface sediment contamination in SMU51a and 51b is enhanced natural recovery, also known as thin layer capping. Conceptually, this is quite different than the thick layer cap required to isolate contaminated sediments at Asarco. The purpose of a thin layer cap is not to isolate the surface sediments but to basically dilute the level of contamination in the biologically active zone with minimal disruption of the existing benthic community. Unlike the strategy for the Asarco site, the idea is to encourage natural processes, including bioturbation, to mix the clean material with the existing surface sediments. While ghost shrimp may be present in Middle Waterway, it is not likely that the fine muds of Middle Waterway are that attractive an environment for them. The ESD proposes to use capping material similar to the fine mud found at the head of Middle Waterway and avoid the use of sandier material reportedly preferred by ghost shrimp. In the unlikely event that a thin layer cap attracted ghost shrimp to SMU51a, EPA is not convinced that the amount of material the shrimp could bring to the surface would constitute a significant source of contamination. The long-term monitoring program will be designed to track if indeed ghost shrimp are present and what if any effects there might be. If there is a clear indication that ghost shrimp are in fact causing a change in the existing protective conditions surrounding the subsurface contamination, EPA will evaluate additional cleanup alternatives.

55. Comment: The MW DESD remedy could impact the fine mud substrates within the estuary that are very valuable and heavily utilized by juvenile Chinook for feeding and provides refuge. Juvenile Chinook actively seek out and utilize the turbid surf zone along the waterline of fine mud tideflats as preferred feeding and refuge habitat. Also, channels within tideflats provide high quality refuge habitat for juvenile salmonids and other finfish during low tides. Without a biological assessment (BA), EPA has insufficient information to determine the impact of the remedial actions to those restoration and mitigation sites and the habitat functions they represent. If capping materials are chosen to exclude or limit marine species capable of bioturbation, then it follows that the sediment used for the capping material would not support native benthic communities, reducing habitat values in and around the head of the waterway. Shrimp are a part of salmon's food system. Considering ESA and Area C's proximity to multiple restoration sites designed to provide habitat for salmon, why does EPA feel this is an acceptable option? In EPA's opinion, would the proposed remedy affect or limit the overall function of the established NRDA restoration sites?(DNR)

Response: EPA does not believe that enhanced natural recovery in conjunction with leaving the subsurface contamination in place in Area C will effect or limit the overall function of the established NRDA restoration sites. This contamination has been in place for an estimated 50 to 60 years and there is no evidence to support a claim that the subsurface contamination is currently impacting the restoration areas. With enhanced natural recovery, surface sediment contamination levels are expected to drop. Juvenile salmon will spend at most only limited time

at the head of the Waterway because this area is only inundated at high tides. There is also other suitable juvenile habitat currently available in Middle Waterway which will be improved as a result of the remedial action. Once the St. Paul mitigation project is completed, it will provide additional suitable habitat for juvenile salmon.

A supplemental BA for Middle Waterway will be prepared once the final design documents are almost complete. The ESD envisions using fine grain material similar to the existing mudflat to help ensure that the native benthic community is protected and rapid recolonization will occur.

56. Comment: The development of the OMMP for the Middle Waterway Superfund problem area must be developed as part of a greater collaborative effort that recognizes the continuity of critical aquatic habitat that has been and will be developed from the mouth of the Puyallup River to the mouth of Thea Foss Waterway. The sediment remediation action in Middle Waterway combined with habitat restoration projects carried out by MWAC, Simpson and the City of Tacoma will create a contiguous habitat corridor that must be managed as a single unit and not as individual segments. Any institutional controls implemented must be consistent throughout the entire corridor. Other issues that must be addressed are monitoring through the corridor and cooperative adaptive management to assure the ultimate success of the entire habitat corridor that will be achieved through a number of different actions.

CHB recognizes that this approach is somewhat unusual and requires a different approach than has been employed in Commencement Bay up to this point. The inclusion of this point into the ESD for Middle Waterway will help to begin the cooperative work process by all parties to set up a comprehensive means of operation, monitoring and maintenance throughout the entire habitat corridor. (*CHB*)

Response: EPA agrees with the overall concept of a comprehensive approach to the development of an OMMP that encompasses all of the cleanup work and habitat restoration efforts in Commencement Bay. EPA intends to collaborate both internally and with appropriate agencies and other stakeholders to develop a plan that assures the success of cleanup activities throughout Commencement Bay.

VIII. Baywide Approach

57. Comment: The Middle Waterway proposed remedial action is an integral part of ecosystem management in Commencement Bay. The MW DESD does not provide enough information to link the proposed remedial actions with the baywide criteria, goals and objectives provided in EPA's documents for Commencement Bay including the CBN/T ESD, CBN/T BA and the CB 404. The baywide criteria, goals and objectives were the fundamental objectives EPA had set for the Middle Waterway Supplemental Biological Assessment. An analysis of landscape scale effects and the degree of success in facilitating ecosystem processes should be considered to determine long-term productivity of habitat functions and fisheries resource enhancement in relation to commercial, industrial and navigation development. Will EPA require a supplemental Biological Assessment? How will the baywide criteria, goals and objectives be included as a part of the supplemental Biological Assessment? How does the Biological Assessment fit into

the remedial design schedule?

How did EPA incorporate the role Middle Waterway plays in the larger watershed, and examine how the proposed remedial actions would best complement the various land use components of the Bay? Zoning, in particular the Shoreline Master Program, played a large role and was ultimately the deciding factor when determining where to site a confined aquatic disposal in Commencement Bay. Did the EPA consider how Area C was zoned? Why does EPA feel the zoning is compatible with the proposed remedy? How will the surrounding land use zoning afford long-term protection of the remedy?(DNR)

Response: EPA has consistently incorporated the philosophy of a baywide approach to cleanup activities, compensatory mitigation requirements, and habitat restoration actions throughout Commencement Bay and will continue to do so. The Commencement Bay Nearshore/Tideflats Biological Assessment dated July, 2000, provided the indicators and pathways approach that EPA uses to assess the level of impact associated with the implementation of remedial actions. The Commencement Bay Substantive Compliance with Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act dated July 31, 2000, (hereafter CB 404) also provided the basis for EPA's selection of disposal sites and established EPA's approach for compensatory mitigation for unavoidable adverse impacts to the aquatic environment. EPA is currently in the process of preparing a supplemental document for Middle Waterway that demonstrates substantive compliance with the Clean Water Act and Rivers and Harbors Act. EPA is also currently working with the National Marine Fisheries Service and the U.S. Fish and Wildlife Service in our preparation of a supplemental biological assessment that addresses the specific actions in Middle Waterway.

Zoning played no role in the remedy selection process for Middle Waterway. However, EPA addresses coastal zone consistency issues within the CB 404 and the supplemental 404 for Middle Waterway addressed above. Our coastal zone consistency examination, which includes review of existing zoning, determined that clean-up actions are considered a consistent use of the shorelines of Middle Waterway. EPA does not anticipate the need for the city or county to modify existing zoning ordinances to ensure continued effectiveness of the remedial activities implemented as a result of this ESD.

XI. Institutional Controls/Aquatic Lands Classification/Waterways

58. Comment: EPA identified the need to impose institutional controls for areas "...that will be capped, or where enhanced natural recovery will be used to ensure that these remedial actions will not be compromised in the future." (MW DESD, p. 7). DNR approaches the issue of management of state-owned aquatic land from a proprietary perspective. This means that DNR imposes institutional controls on activities that occur on state-owned aquatic lands through a lease, permit, or other form of use authorization. There are three constraints placed on DNR in regards to institutional controls:

1. DNR must be able to issue a use authorization in order to impose institutional controls. DNR does not possess regulatory powers over aquatic lands. The legislature has, by

statute, prohibited DNR from selling lands, or issuing leases or permits for activities within a state waterway like Middle Waterway.

2. DNR, in making decisions regarding state-owned aquatic lands, must meet legislative requirements for managing state-owned aquatic lands. Namely, to encourage public use and access, to foster water dependent uses, to ensure environmental protection, to promote the commerce and navigation, and to utilize renewable resources where feasible. Will EPA take DNR's legislative constraints into account in the remedial decision-making processes?
3. DNR is required, by its NRDA Consent Decree for Commencement Bay, to consult with the Commencement Bay Natural Resource Trustees prior to the issuance of any use authorization, inaction or any decision regarding state lands within Commencement Bay. Paragraph 8 of the NRDA Consent Decree states:

WDNR agrees, upon the request of the Natural Resource Trustees, to consult with the Natural Resource Trustees regarding material impacts or potential material impacts that its actions, planned actions or failure to act may have upon Commencement Bay Environment marine resources. Natural Resource Trustees may provide all data and analyses which tend to indicate impacts, or lack thereof, on the Parcels. WDNR agrees that it will work with the Natural Resource Trustees in good faith to identify promptly the impacts caused or potentially caused by WDNR's actions or inaction, and to identify in a timely manner corrective measures needed to prevent or alleviate detrimental impacts. The obligations under this paragraph shall extend to December 31, 2045.

Without a supplemental Middle Waterway Biological Assessment, DNR is unable to determine what institutional controls will be required, or sufficient to meet the natural recovery goals defined by the natural resource trustees.

Aquatic Lands Classifications and Institutional Controls:

The Middle Waterway remedial action contains two state land use classifications: Harbor areas and waterways. Harbor Areas are zoned under the Washington State Constitution for Commerce and Navigation. SMU 5a is located primarily within the harbor area located to the west of Middle Waterway (a portion of the area is located on private tidelands owned by Foss Maritime). The MW DESD selects natural recovery for this site, and requires institutional controls so that the remedial action would not be compromised.

The extent of the institutional controls required to protect the remedial action in SMU 5a will take a coordinated agency effort similar to the process taken at the Olympic View site to remove derelict vessels. DNR's authority relates to the occupation of harbor areas, not to navigation. Who will take the lead and coordinate efforts with the other federal, state and local agencies to implement institutional controls on navigation? What institutional controls does EPA feel will be

necessary for a harbor area constitutionally reserved for commerce and navigation?

Waterways:

The Middle Waterway is a state waterway. "All waterways shall be reserved from sale or lease and remain as public highways for watercraft until vacated as provided for... (RCW 79.93.060). " Caps, CADs or remedies requiring institutional controls that restrict the use of the waterway for the purposes of navigation so as the waterway cannot be maintained and dredged for its intended use would be inconsistent with the definition of a state waterway.

There are provisions that allow the waterway to be vacated if it is decided that the use of the waterway is no longer needed. The vacation process needs to be carried out prior to the construction of the proposed remedy. Vacation of the waterway can occur by written order of the Commissioner of Public Lands upon request by ordinance or resolution by the city council of the city or by resolution of the port commission. RCW 79.93.060 outlines the process for vacating a waterway. Since waterway vacation is a significant state action, a SEPA determination is needed. A waterway vacation is a staff intensive procedure that is decided on a landscape scale. How will EPA include the waterway vacation process in the remedial design schedule? How will EPA include allocations for administrative costs should the remedy require the state waterway to be vacated?

On page 7 of the MW DESD, it notes that the remedial action requires dredging in the waterway within Area A. The legislature has not delegated to DNR the authority to approve or disapprove dredging of state waterways. The legislature has delegated that authority to local entities. This would apply either to Port Districts under RCW 53.08.060, the Cities under RCW 35.22.280 (25), owners of adjacent lands under RCW 91.08, or approved by the Board of County Commissioners under RCW 91.08.010.(DNR)

Response: Comments identified limitations of DNR's authority to implement institutional controls. EPA will consider these limitations while specific institutional controls are developed during the design phase of the project. EPA will work with those federal, state or local agencies that regulate activities related to any necessary institutional controls.

EPA acknowledges that DNR does not have the authority to provide access for the purpose of dredging of state waterways. The party who implements the remedies selected in this ESD will be responsible for obtaining whatever access is necessary to implement the remedy.

59. Comment: DNR is concerned EPA is factoring in the rebuilding of structures in its Table 2: Cost Estimate for Alternative A-2, that encroach into the waterway. The wooden pier and the scow shed located in SMUs 29 and 46, and the floating drydock, encroach into the waterway. Most of those structures are extensions of structures located on Foss Maritime property. The scow shed has a city building permit even though waterways should only include temporary structures for navigational purposes (City Code Chapter 4.24.020). Why is EPA factoring these costs into the cost estimates when these encroachments may not be authorized?(DNR)

Response: EPA relied on the cost information provided by MWAC. Whether or not the encroachments are authorized is not a determination to be made by EPA. The encroachment issue is one that must be resolved by the PRPs with the appropriate permitting agencies. When a remedial action includes the demolition and/or reconstruction of a building or other structure, the cost estimate for the remedial action should account for the demolition and/or reconstruction activities as was done here.

60. Comment: It should be noted that the city has authority to regulate activities within the waterways (RCW 35.22 (26) and City Code Chapter 4.24), not DNR. Vessels awaiting repair at the Marine Industries Northwest shipyard are often moored or anchored in the waterway. Larger vessels have been grounded at low tides. If this practice continues at the shipyard, will it impact the proposed remedy?(DNR)

Response: If a large vessel were to be grounded, it would occur in an area that will have been dredged and will meet the SQOs. There is no cap or natural recovery area that could be impacted by a large vessel being grounded at low tide, therefore, there will be no impact to the selected remedy.

X. Performance Criteria

61. Comment: Because the MW DESD proposes to leave contaminated sediments in-place at the head of the waterway, its location in an urban embayment, its suitability for ghost shrimp and other marine organisms, and because little to no natural sedimentation occurs at the head of the waterway, it is plausible that the contaminants could be exposed due to a severe storm event, vandalism, bioturbation, or some other mode. This exposure could result in far greater adverse effects to the restored habitat areas than any short-term disturbance resulting from a cleanup operation. In the August 2000 ESD (pg. 12):

"Areas selected for natural recovery (including enhanced natural recovery will require: (1) monitoring plans, (2) triggers for initiating contingent actions of the monitoring indicates natural recovery will not succeed in the 10 year time frame, and (3) contingent plans for active remediation if monitoring in interim years indicates natural recovery will not occur by year 10. "

Given this, if the head of the waterway has not been dredged for over 30+ years and aerial photos do not visually indicate changes in the mudflats at the head of the waterway, how does EPA support the sedimentation model? How does it accurately portray the function of the waterway and sediment transport? And, why is EPA willing to wait an additional 10 +/- years after construction of the remedy to determine that natural recovery is plausible? With a minimal deposition of clean sediments, how are severe storm event, vandalism, bioturbation, etc. considered into the sedimentation pathways?(DNR)

Response: The comment's focus on Natural Recovery implies a possible misunderstanding of the proposed remedy for the head of the Waterway. The proposed action for SMUs 51 a and 51 b is Enhanced Natural Recovery (ENR); No Action is proposed for SMU 52a and 52b. Nowhere

in Area C has Natural Recovery been selected as the preferred remedy.

The results of modeling analyses conducted to study the potential effectiveness of placing a thin layer of clean material atop existing sediments (ENR) are presented in the DAR. The analyses performed for SMUs 51a and 51b assumed that there is no natural sediment deposition in this part of the Waterway. This is consistent with the lack of change observed in this part of the Waterway over the past 50 - 60 years.

The modeling did not attempt to address events such as severe storms or vandalism, perceived to be of comparatively low probability and highly unpredictable. The potential for bioturbation to act as a transport pathway appears to be comparatively minimal considering that the present observed distribution of contamination shows at most limited evidence of mobilization of the subsurface contamination. Ghost shrimp are reported to avoid areas with high concentrations of fine-trained sediments; limited addition of clean material to Area C for ENR is unlikely to alter the current tendency towards fine-grain material enough to lead to significant colonization by ghost shrimp.

EPA acknowledges that it is not possible to foresee every possible set of future circumstances that could effect the preferred remedy. As with nearly any "real-world" remedy there is some potential of a future event occurring which could cause the remedy to fail.

XI. Environmental Reserve/Withdrawal Areas

62. Comment: On page 10 of the MW DESD, EPA has stated that SMU 51a has been designated by DNR as an Environmental Reserve. On May 24, 2000, an Executive Order was signed by the then Commissioner of Public Lands, Jennifer Belcher, that withdrew the state-owned aquatic lands in Middle Waterway from leasing. The order stated that the lands should be set aside as an "environmental reserve." The basis for the withdrawal order relates to the unique habitat and critical species that utilize the area. As clarification, DNR has not designated the head of the waterway as a reserve, but rather has withdrawn the area from leasing for activities inconsistent with a natural reserve. DNR does not have authority to issue leases within a waterway. DNR does have authority to issue easements for bridges and utility crossings over and under the waterway. The withdrawal order would affect those types of authorizations. How the withdrawal order affects other agencies authorities needs to be considered by DNR. Other local agencies have development rights within the waterway that do not require DNR approval: i.e. Port of Tacoma (RCW 53.08.060), City of Tacoma (RCW 35.22 (25), and Pierce County (under RCW 91.08).

Currently, DNR is in the process of reviewing the aquatic reserve program and all aquatic lands designated as a reserve or withdrawn from leasing in the year 2000. Doug Sutherland, Commissioner of Public Lands, believes this environmental review and public process, followed by program development and planning, are necessary actions to complete prior to making a final decision on the status of these unique areas. DNR staff will review the selection criteria, designation process, and management parameters for aquatic reserves and withdrawn areas, while affording the opportunity for public participation and considering environmental

alternatives through the State Environmental Policy Act (SEPA) process. DNR staff will also conduct reviews to ensure that aquatic reserve designations and areas withdrawn from leasing are the most appropriate management tool for habitat protection. No uses will be authorized within designated reserves or withdrawn areas until the program guidance and criteria are adopted. EPA and other entities making plan for the waterway should understand the current withdrawn area in Middle Waterway may change in area, it may dissolve, or it may become more restrictive.(DNR)

Response: The ESD will be revised to eliminate the reference to “Environmental Reserve.”

XII. Monitoring Program

63. Comment: Assumption: Monitoring costs for ENR were extended out for 5 or possibly 10 years. The primary concerns around which the monitoring for ENR is designed are long term effectiveness. Except for significant episodic events such as storms or flooding, there would be little chance that the first 5 to 10 years would be problematic as far as breakthrough and surface exposure of the contaminants. Yet this is the timeframe for which monitoring costs are estimated in the Alternatives evaluations. The concern is greater with time which must be reflected in the monitoring costs. This must also be considered with respect to long-term liability and EPA’s ability to enforce future contingency efforts, should the ENR fail down the road. (*Ecology*)

64. Comment: Section V. C. Area C, pg 11. The second paragraph needs to be expanded to include at least 5 years of additional monitoring of SMU 51b after the completion of the freshwater input to Middle Waterway. This freshwater input is required as mitigation for the Port of Tacoma Slip 1 nearshore confined disposal facility. It is essential to know if the freshwater input changes the hydrology of the waterway enough to expose the contaminated sediments. This additional monitoring need not include chemical and biological testing. It should include surveying and inspection of the physical integrity of the mudbank and channel to ensure that the contaminated material has not been exposed and that the channel is not meandering. Extreme storm events should also trigger additional monitoring of the mudbank and channel.

As it is not known when this freshwater input will be completed, the Five Year Review, required under CERCLA, may not detect this additional exposure risk. Beyond the Five Year Review, CERCLA requires monitoring to ensure the protectiveness of the remedy when contaminated material is left in place. NOAA recommends that full physical, chemical, and biological testing, outlined on page 9, be performed every 5 years for 30 years post completion. (*NOAA*)

Response to Comments 63 and 64: The information in the cost estimate summary in the ESD is based on the best available information regarding the anticipated scope of the remedial alternative. The cost elements are likely to change during the remedy design phase. This is an order of magnitude estimate expected to be within +50 to -30 percent of the actual project cost. The monitoring requirements envisioned by this ESD differ from the assumptions used by MWAC in developing the project cost estimates. Since subsurface contamination will be left in place at the head of the waterway, long-term monitoring will be required for any potential changes in the subsurface contamination. While monitoring timeframes have not yet been

established, clearly the need for monitoring will extend more than ten years into the future.

The long-term monitoring plan will include requirements for other monitoring in addition to chemical and biological testing as well as triggers for possible additional testing. Monitoring objectives will be designed to ensure that exposure from possible erosion or from other changes in the waterway is not occurring. The plan will also require monitoring after major storms and other significant natural events such as earthquakes. The draft long-term monitoring plan will be made available for review and comment by appropriate stakeholders.

XIII. Coordination with Other Projects

65. Comment: Simpson believes that the proposed Middle Waterway cleanup plan can be effectively implemented without any adverse effect on the sequencing of the Thea Foss cleanup and habitat plan or construction of the St. Paul CDF. *(Simpson)*

Response: Regarding sequencing of the various activities for Thea Foss and Middle Waterways, EPA intends to coordinate all the necessary work and agrees that the Middle Waterway cleanup plan can be implemented without any adverse effect on the Thea Foss activities.

XIV. Comments Accepted

66. Comment: Section V. A. Area A(e), pg. 8. In general, areas requiring dredging will be dredged deep enough to expose clean sediments. NOAA completely supports this goal. However, “clean” has different meanings to different people. Please define clean as either below background, or below SQO. *(NOAA)*

67. Comment: Section V. C. Area C, pg. 9. The first paragraph in this section list long-term monitoring parameters for SMU 51 a. Please also include biological testing. As a large quantity of highly contaminated material will be left in place, NOAA expects long-term monitoring of this area to explicitly include biological testing. *(NOAA)*

68. Comment: In addition, please correct Figure 2 and remove the reference to Simpson Tacoma Kraft Company, as we have previously requested. Simpson Tacoma Land Company is a separate corporation and is the owner of this property. *(Simpson)*

69. Comment: The Notes on Tables 2 and 3 should state that the aquatic disposal costs are “based on disposal in Blair Slip 1” (as stated on Section IIID, page 5), and not simply list the entities which made the cost estimates. The aquatic disposal costs per cubic yard in Table 2 are considerably higher than the St. Paul CDF cost estimates. This clarification is important to avoid confusion by other PRPs regarding the costs of aquatic disposal outside of Blair Slip 1. *(Simpson)*

70. Comment: Simpson Timber Company has recently completed and is operating the new Tacoma Sawmill, located between E. 11th St., Portland Avenue, Middle Waterway Street (a private street), and St. Paul Waterway. As part of the mobilization for the Thea Foss cleanup project, the Simpson Timber Company log haul out will be relocated to Middle Waterway (in what appears to be SMU 39 on Figure 2). The Tacoma Sawmill stormwater outfall will also be relocated in this vicinity per the Thea Foss final design documents being submitted to EPA this fall.

The ESD should require coordination of these activities. We suggest the following: "The final plans and specifications for the Middle Waterway cleanup and implementation of the remedy should be coordinated with Simpson (please contact Dave McEntee, 253-680-6894) to avoid any impacts on these operations, as well as with any mobilization or construction work for the Thea Foss remedy." (*Simpson*)

Response to Comments 66 through 70: The ESD will be modified consistent with the suggested changes.

XV. Wording Changes Rejected

71. Comment: Section V on page 6 should provide some further clarification of the nature of the contaminated sediments, given EPA's past comments. The last sentence of the second paragraph should be clarified as follows:

"Despite initial concern, the remedial studies did not find substantial quantities of woody debris in the sediments. The primary contaminants of concern that require cleanup of surface and subsurface sediments at the head of the waterway are mercury and copper. The primary contaminants of concern that require remediation of subsurface sediments at the head of the waterway are PAHs at depth." (*Simpson*)

72. Comment: The ESD should also note on page 6 that there is essentially no cleanup required on the Middle Waterway tidelands owned by Simpson Tacoma Land Company (see dotted property line on Figure 2 of draft ESD). (*Simpson*)

73. Comment: Section VI.B on page 13 should note that: "Simpson, which owns the eastern shoreline of Middle Waterway, has no active operations on Middle Waterway other than a natural resource restoration project site and has not been identified as a source of contamination in the referenced Ecology milestone reports." (*Simpson*)

74. Comment: Approximately half a decade ago, EPA staff requested Simpson's assistance in facilitating cleanup of Middle Waterway. Simpson recommended design plans be prepared to dredge the navigational area in the mouth of the waterway to remove sediments above SQOs, and that original mudflat at the head of the waterway largely be left alone. Simpson initially made this recommendation in 1992.

As indicated above, Simpson does not believe it bears responsibility for Middle Waterway

cleanup. As an adjacent property owner, and as an entity working with EPA, the City, the Puyallup Tribe, DNR, the Thea Foss participants, and other interested parties to facilitate cleanup of Commencement Bay, Simpson generally supports the proposed remedy. (*Simpson*)

General Response to Comments 71 through 74: These comments reflect the belief that the company is not responsible for cleanup actions required in Middle Waterway. The ESD describes the significant differences between the remedial action selected for the Middle Waterway and the CB/NT ROD. It also describes the rationale for selecting remedial actions for the Middle Waterway. The ESD is not intended to articulate all information related to the nature and extent and sources of contamination of the Middle Waterway. This information may be found in the Administrative Record and the site file for the CB/NT Superfund site. In addition, the ESD is not the appropriate document for articulating a particular party's position regarding its remedial liability under CERCLA. Therefore, these suggested wording changes are deemed inappropriate for the ESD and will not be incorporated.

MIDDLE WATERWAY EXPLANATION OF SIGNIFICANT DIFFERENCES

CONCURRENCES					
Initials:	<i>[Signature]</i>	<i>T. Yackulic</i>	<i>N. Harney</i>	<i>L. Cohen</i>	
Name:	E. Kowalski	T. Yackulic	N. Harney	L. Cohen	
Date:	2/4/02	2/1/2002	02/04/02	2/4/02	